Telephony.

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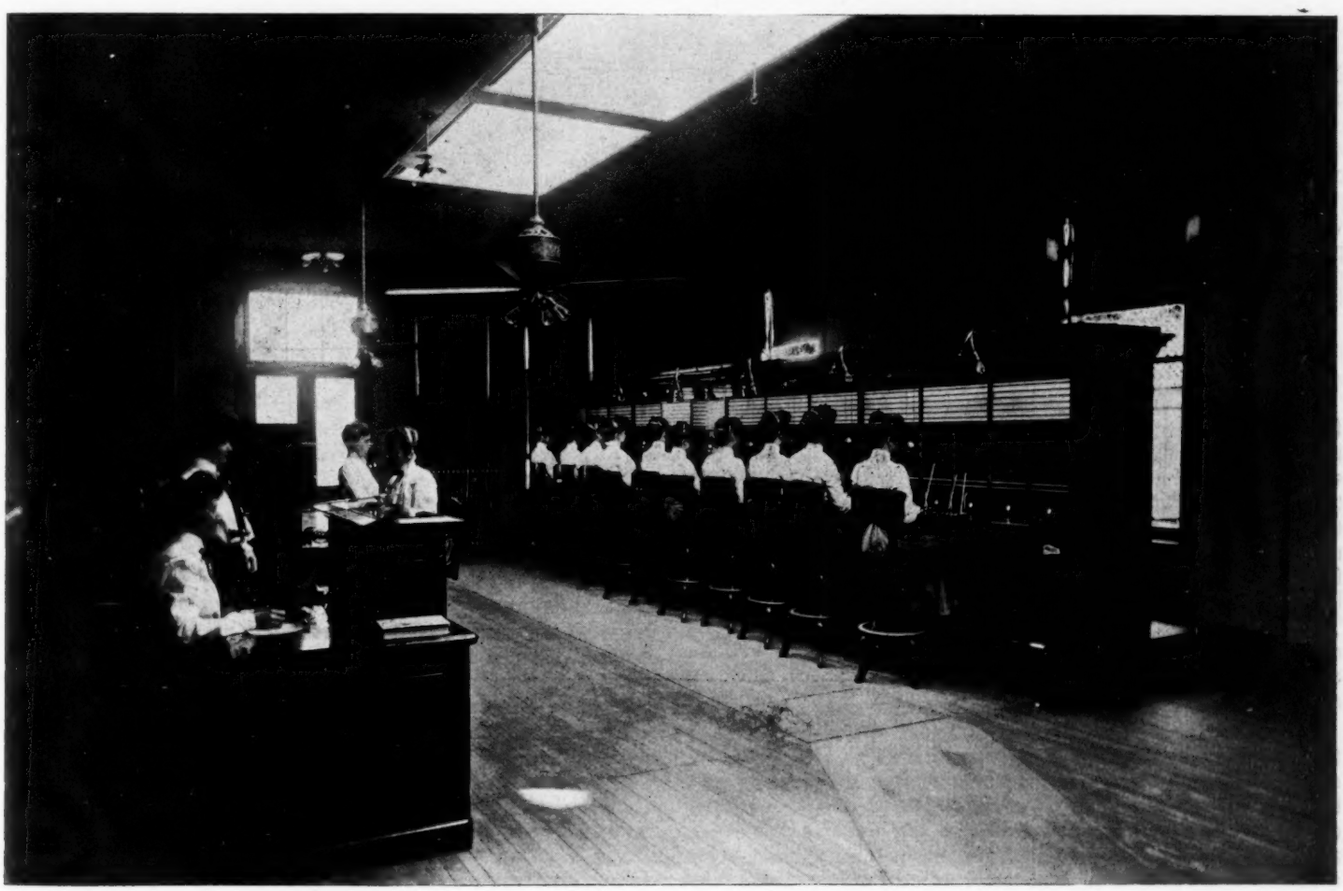
The Jamestown Telephone System.

That the Independent telephone system is gradually securing a permanent and effectual foothold in the east as well as in the west is shown in the recent erection and successful operation of the Home Telephone Company's exchange at Jamestown, N. Y.



VIEW OF THE HOME TELEPHONE COMPANY'S SWITCHBOARD, JAMESTOWN, N. Y.

Jamestown is a thriving city of approximately forty thousand population, located a short distance from Lake Chautauqua, and on the main line of the Erie railroad. Among its many industries is that of furniture manufacturing. The city as a whole is industrious and prosperous, and has experienced the necessity of having good, reliable telephone service at equitable rates. A local company was formed and is now, as well as for the past six months, giving satisfactory service in every respect.

The system installed is a full central energy metallic circuit, deriving all battery, both for signaling and talking on the local exchange lines, from one set of storage batteries at the central office. The number of individual metallic circuits at present installed is 1,200, with provisions for increasing to 3,000.

The toll line situation at this point is also an important one. All the neighboring towns are being connected with

the toll board, and steps are being taken for making connection with Buffalo, Pittsburg, Youngstown, Cleveland and all important points reached by Independent lines. Twenty-five toll lines are already provided for and provisions have been made for one hundred.

The telephone system is most complete, consisting of the central office building, with its central energy multiple switchboard, toll board and accessory apparatus, underground conduit and cable system, pole line and aerial cable and wire system, together with the sub-station and lightning protection system. Each is complete in every respect, and of the latest improved design.

The underground conduit system embraces the main business district. The multiple duct type of vitrified clay conduit was utilized throughout, in accordance with standard specifications. The general plan followed was to locate the distributing poles in the center of each block, providing lateral conduits connecting with the main or branch conduit lines at manhole intersections. The distributing poles were equipped with circular tops to enable the drops to be distributed in all directions. The conduit lines for reaching residence districts terminate in manholes and laterals provided for extending to the cable terminal poles. Iron pipe bends are used at the base of the poles cemented to the lateral ducts, and are extended up the poles practically to the base of the cable boxes, so as to protect the sheath of the cables therein contained from being punctured by accident or design.

The underground cables used are of the dry core type, No. 19 gauge, double wrap, paired and provided with lead sheath. The main cables are of 200 pairs with smaller sized cables for branches. Where branches are taken off, Y splices are made on the main cables in the manholes. The cables on cable poles terminate in flexible pot-heads with plain bkonite twisted pairs soldered to terminal clips. Bridle wires, carefully insulated, are carried out to the pins. Each pair of drop wires are fastened to the insulators, and connected to the bridle wires throughout five ampere tubular line fuses.

The underground cables were drawn into the conduit system, carefully spliced and laid up in the manholes. Considerable difficulty was at first experienced by the cables "creeping" on the steep runs, but this has been successfully overcome. The cables at the office end are spliced into two 100-pair cables of No. 22 gauge, double silk and single cotton insulation and leaded. Splices were made in the cable run in the basement as near below the main distributing frame on the first floor as convenient, and terminated on the cable clips, removing the lead sheath sufficiently above the floor line to permit the conductors to be fanned out for terminating, and thoroughly shellaced. This method of splicing leaded switchboard cable to the underground cable avoided the necessity of making pot-heads at the central office and greatly facilitating connecting the cables on the main distributing frame.

The pole line leads are pointed out with pride by the local telephone company, and erected with a view of being an ornament to the streets rather than be classified as obstructions. The routes were carefully selected and the utmost care exercised in the construction of the work. Pole leads are of 40, 50 and 60 foot poles, and 60, 70 and 75 foot poles are used for the cable and pole top distribution. Aerial cable was used extensively and No. 12 B. & S. gauge copper wires were used for the local distribution wires.

The underground and pole line work was accomplished at considerable expense above that of average conditions, owing to the stony subsoil and uneven contour of the ground, amounting to hills and steep inclines in the main part of the city.

The central office building was designed and built especially for the purpose; is a two-story brick building with ornamental pressed brick front and plate glass windows. The front portion of the first floor is fitted up for the manager's office, accounting department and public pay-station. Messenger service with uniformed boys is provided in connection with the pay-station service for notifying parties that have not taken service when toll calls are made for them. In the rear is installed the terminal and power apparatus and wire chief's desk. On the second floor is the operating room and operators' quarters, also drafting and record department. The basement is used for a general storeroom for stock apparatus and line supplies.

The central office apparatus consists of a central energy visual signal, series multiple switchboard, equipped at the present time for 1,200 subscribers' lines, providing 120 lines per operator's position. The switchboard is built in four sections, three operators' positions in each section, and each section having a multiple capacity in the multiple for the accommodation of 3,000 lines. The switchboard is arranged to grow from left to right. The first position of the first section is reserved as a multiple annex position. The second and third position of the first section, also the first, second and third positions of the second and third sections, and the first and second positions of the fourth section, are each wired and equipped complete for 120 visual signal line equipments, making a total of 1,200 lines. The third position of the fourth section is used as an annex position. Each of the operators' positions are equipped with the full complement of multiple jacks, permitting each operator to have complete access to the full multiple directly within her reach, and likewise with necessary provisions made so that each operator will have complete access to the ultimate capacity of the multiple when the capacity is reached.

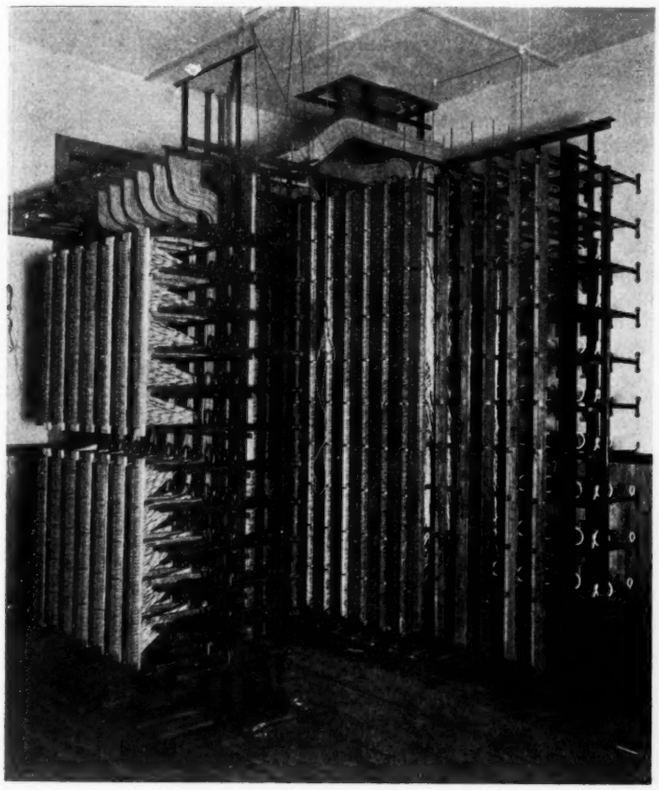
Each operator's position is equipped with fifteen pairs of cords, with full double lamp supervisory signals, ringing and listening keys and all associated apparatus. Each keyboard is further equipped with order wire keys and operator's telephone equipment complete, consisting of a transmitter supported by means of flexible cords from an adjustable transmitter support, operator's head telephone and band attached by means of flexible cords to an operator's plug, two operator's cut-in jacks connected in multiple, and so wired that when the plug is removed the operator's transmitter circuit is opened. The second operator's jack is provided to enable the line operator to listen in on connections so as to familiarize herself with the operation of the switchboard. Each operator's position is further equipped with a line call pilot lamp to light as soon as any unanswered call remains on the respective operator's position, and likewise providing a ringing supervisory pilot lamp to notify the operator when the line on which the operator is ringing is in an operable condition.

The line signals used throughout the switchboard are the magnetic visual signal type mounted in the upper part of the switchboard in strips of twenty and protected by ground glass plates, so arranged that when the visuals are in their normal position they are concealed by the ground glass strips, and appear in the clear glass strips when operated, displaying the number corresponding to the answering jack. The line visuals are properly mounted in the upper part of the board above the multiple jacks, so as to facilitate supervision on the part of the chief operator and monitor operator. The line visuals are operated directly by the current that flows from the main battery over the subscriber line when he takes the receiver from the hook. Economy in battery consumption is thus produced, as only that current which must necessarily flow from the line to give a signal is used to operate the line signal.

The answering spring jacks are mounted in strips of ten and numbered in panels, corresponding to the numbers on the line visuals, and also provided with a second set of numbers which are removable to correspond with the subscriber line number. The multiple jacks are mounted in strips of twenty and numbered from 0 to 9 and 00 to 9, mounted in

banks of 100, the one hundred numbers being stamped on the stile strips directly associated with the multiple jacks. The answering and multiple jacks are provided with tip and sleeve german silver springs, and german silver thimbles.

There are absolutely no talking contacts in the telephone line circuit from the last jack to the connector strips on the main distributing frame, this preventing any possibility of interference with proper transmission owing to poor and



VIEW IN THE TERMINAL ROOM.

faulty contacts. There are no relays in the line circuits and the contacts for cutting off the line visual when the operator plugs in to answer are in an independent signaling circuit, which in no way can interfere with the talking circuits. The line circuits are not only clear of undesirable contacts, but are also properly balanced; impedance coils being provided on the tip side of each line, thus rendering the circuits balanced both in the normal signaling position and also in the talking position when connections are established by means of the cord pair. The fundamental points that determined the selection of this type of board were simplicity of the system, low cost of maintenance, small battery consumption, quality of transmission and complete supervision.

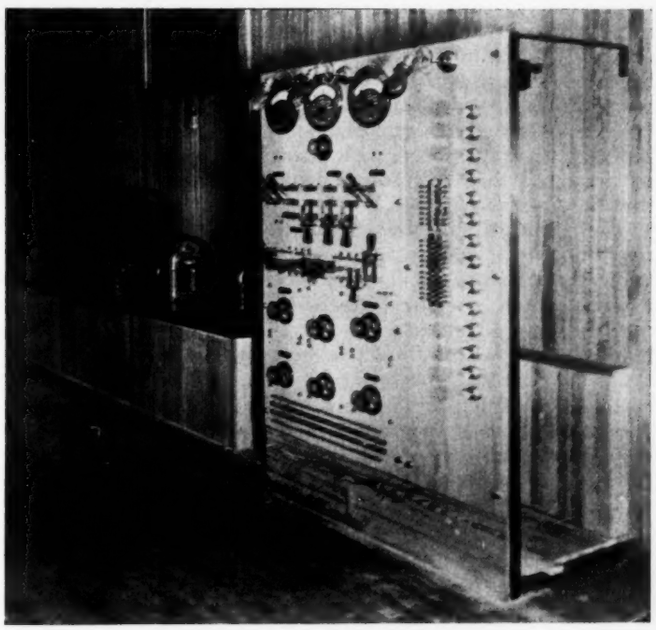
The switchboard frames are made of quarter-sawed oak, finished in golden oak, with high grade piano polish. All unequipped space in the multiple and answering jacks were filled in with ebonized strips and highly polished. Brass foot rails are provided and also running boxes for the answering jack cables. The switchboard is very successfully lighted by means of incandescent lamps, using duplex lamp brackets, the alternate lamps being on separate circuits.

A one-position combination chief operator's and monitor's desk is in use, the desk being of the flat top type, provided with a tier of drawers at one end, and having mounted on top a turret provided with pigeon holes and book stalls, and with sufficient space for mounting therein the necessary supervisory apparatus. The desk is equipped with monitor keys for monitoring each of the subscriber operators, and listening-in packs provided for monitoring the operators without their knowledge. There is also provided a line call pilot lamp corresponding to each equipped A operator's position, to light when a call comes in on the corresponding position, and which remains lighted until that operator has answered the call. The chief operator, whose attention is attracted to the various positions by the lamps lighting, can, by glancing along the board, see the visual signals and know just what subscribers are calling, and are in complete touch with the traffic at all times. By listening in with the monitor jacks or keys, she can ascertain just what each operator is doing, and by observing the line visuals along the switchboard she can see how many calls are coming in and the promptness with which they are answered. The desk is further equipped with connecting appliances and exchange lines.

There is also provided in the terminal room a wire chief's desk similar to the chief operator's desk in design, and equipped with exchange lines, test lines to the subscriber switchboard, special test lines terminating on test plugs on the main distributing frame, order wire keys, necessary testing appliances for testing for short circuits, crosses, capacity and for testing on the toll lines. There is provided a Weston portable volt-meter, double scale, to facilitate the tests.

Two two-position toll boards are installed, each position being wired for an ultimate capacity of twenty toll lines. The first position is fully equipped at the present time, and five lines are equipped in the second position. Provision is made for multipling the full capacity of the toll board in each section, enabling each operator to have complete access to each toll line without trunking, when additional capacity is required for the toll board.

The keyboards are wired for ten pairs of cords, each pair provided with tubular clearing-out drops, double ringing



THE POWER BOARD AND GENERATORS.

and listening keys, the first five pairs being further equipped with repeating coils and controlling keys. The first position only is equipped at the present time and provided with operator's telephone equipment complete. Incoming and outgoing trunks to the subscriber switchboard are also provided, affording complete connection between the toll lines and local lines.

The toll switchboard cabinets are each two-position, with the tubular line and clearing-out drops mounted in the upper part of the switchboard frame, space being provided immediately below for the multiple toll lines and with the

trunking and answering jacks in the lower portion of the answering jack space. Night bell and pilot lamp equipments are provided, and space is provided between each two operator's positions of each section for mounting calculagraphs. The keyboards are hinged and sufficient space is left between the keys and the edge of the keyboard for writing purposes. Pigeon holes for filing toll tickets and also bookstalls are provided, making the toll board complete in every respect.

In the terminal room immediately below the switchboard are located the main and intermediate distributing frames, mounted side by side, and the impedance coil frame. All cables to the multiple and answering jacks are terminated on terminal strips, properly numbered to correspond, and jumper wires are installed for connecting the answering jacks with any desired multiple jack. Provisions are made for accessibility in making cross-connections and the ready removal of dead jumper wire.

The main distributing frame is provided with combination carbon and sneak current lightning arrestors of the most approved type, which are directly connected by means of cables with the cable terminal clips on the intermediate distributing frame. Cable terminal strips are provided on the cable side for connecting thereto the outside cables as previously described. Provisions are also made on the main distributing frame for cross-connections similar to those provided for on the intermediate distributing frame. It is to be noted that in all cabling between the main and intermediate distributing frames, and also between the intermediate distributing frame and the multiple in the answering jacks, the cables are carried overhead and carefully supported, made up and tied into position. No cables are allowed to lie on the floor or pass through the floor without being properly protected.

The battery plant for the operation of the system consists of one set of storage cells of the Electric Storage Battery Company's manufacture. Eighteen cells are provided connected in series, consisting of all metal tanks, and sufficient for the total capacity of the switchboard. These tanks are at the present time equipped with the necessary elements required for the present operation of the switchboard, and so arranged that additional elements may be added from time to time as required by the growth of the system.

There are provided two Roth Bros.' motor generators to operate on 110 volts power circuit, having a maximum capacity of 40 amperes at 60 volts. The charging machines are duplicate, as a guard against accident to the machines, and of such design that in case the storage battery is disabled for any reason the switchboard may be operated direct from the charging machines.

There is also provided two ringing dynamotors of the Roth Bros.' type, one operating from the 110-volt power mains, and the second operating from the 40-volt storage battery. The ringing machines are provided with howler and busy back attachments. The necessary apparatus is installed on the wire chief's desk for the operation of the howler to attract the attention of the subscribers in case they neglect to hang up their receivers.

The power board consists of a pink Tennessee marble power board provided with Weston, flush type instruments, consisting of two ammeters, one for indicating the ampere discharge from the storage battery, and the second to indicate the charge of the storage battery. A Weston, flush type volt-meter is also installed on the board, provided with two scales, 0 to 3 and 0 to 75, together with a dial plate, six-point Crouse-Hinds switch for taking the voltage of the several parts of the power plant. There is mounted on the power board the necessary number of switches for the proper operation of the battery plant, likewise the necessary starting boxes and rheostats for use in connection with the power machines.

All switches are properly supplied with designation plates to facilitate the operation of the power plant. All power wiring was done with rubber covered braided wire, of such size as to preclude any possibility of cross-talk in talking circuits, and installed in accordance with the rules and regulations of the Board of Fire Underwriters.

The sub-station equipment consists of central energy telephones, both portable and wall type, to meet the requirements of the individual subscribers. Golden oak cabinet work prevails, although a number of mahogany finish telephones are furnished. Ebonized finish residence telephones are furnished where especially desired. Each telephone, in addition to the lightning arrestors on the instrument, is protected with combination carbon and heat coil arrestors mounted in glass shells, to provide protection to the sub-station equipment and wiring against lightning or sneak currents.

To T. S. Lane, general manager of the Lane Construction Company, which was incorporated especially for the construction of this plant, is due the credit of organizing the local telephone company and the construction of the plant, as evidenced by his characteristic energy and ability in the organization and construction of telephone plants in general. The construction work was done under the direct supervision of A. L. Van Ostrand, the superintendent of construction and equipment, whose long experience as assistant to the superintendent of construction of the Bell telephone exchange at Chicago fitted him to adopt the most modern methods of construction of both the aerial and underground systems. The telephone apparatus complete, including both the central office equipment and the sub-station equipment, was furnished and completely installed by the Stromberg-Carlson Telephone Manufacturing Company.

TRAIN DISPATCHING BY TELEPHONE.

Statistical reference shows that the advance made by telephony in later years is paralleled by no other electrical activity. What, then, must its future be, when we realize that the large corporations are but learning the advantageous results obtainable from use of the telephone?

Telephony is yet in its infancy; telegraphy in its dotage. Already some of the large railroad corporations are estimating and watching the successful results obtained by operating their train service by telephone. For the safe handling of trains in the present day, which involves life and chattels, a railroad must be thoroughly equipped with equally thorough telegraph operators. Those who can, at the click of the sounder, respond with that cool-headedness so necessary to the successful handling of railway trains. And to become an efficient telegraph operator requires severe training for perhaps three years, and in many cases men who have served their apprenticeship for such a period have been placed in positions of trust by railroad officials, only to prove how disastrous the results when an incompetent telegrapher is at the key.

On the other hand, a telephone can be operated by almost any one. And it is the simplicity of operation that is leading railroad magnates to recognize the fact that it will soon be the chief factor in successful train dispatching.

Moreover, there are many small towns and stations scattered along a railroad that must be equipped with at least two men—viz., the telegraph operator and the station agent, when in reality the business of the town does not warrant the employment of but one of these men. The installation of a telephone system to replace the key and sounder would at once reduce the road's operating expenses.

The only really objectionable feature which can be advanced is that one cannot talk as far as is possible to telegraph in a single relay. But this is a feature that is rapidly being overcome, and it is but a matter of time until train dispatching and general operating of railroads by telephone will be universal.

Independent Telephone Systems.*

By J. J. NATE.

The preparation of this series of articles was begun with a view of setting aright before the telephone public the true situation as it presents itself to-day to the telephone investor, operator and subscriber.

At intervals for some time past pamphlets have made their appearance ranging anywhere from five to thirty pages, the object of which has been to discourage the work of the Independent telephone operators. The misleading statements made at various times through this means are so much at variance with the facts that some plain truths are called for. I am indebted for the figures and statistics, which I have compiled as a result of quite a continuous effort, to the various Independent exchange and operating companies throughout the country. I am pleased further to acknowledge and thank the gentlemen who have furnished me with figures, facts and letters covering the subject in its entirety.

An anonymous letter or printed product at the hand of any individual or corporation calculated to injure those interests with which one may be identified stamps the originator as unworthy of any honest man's consideration; still, in a field so broad and where so many millions have been fearlessly invested in a fight against a monopoly whose warfare has been waged against the Independent telephone cause along unfair and oftentimes apparently questionable lines, it is well to offer some manly defense. I have before me a thirty-page pamphlet entitled "Opposition telephone systems, their failure and the reason therefor." There is no signature to this pamphlet, not even the trade-mark of the printer who compiled it, yet its every line is written with a view to intimidate capital and discourage the Independent telephone movement. The pamphlet in question deals more particularly with the Western cities, principally along the Pacific coast. It may be assumed without argument that its appearance is due to the present activity in the Independent telephone work of organization in the far West, a movement which is surely gaining force every day. The gigantic work performed in the Independent field during the past seven years has centered largely through the middle states, or, to put it differently, because of the strength of the Bell company in the New England states and because of the extreme distances between towns and cities in the far West, very little as yet has been undertaken in these two territories, but the magnificent showing through the country generally has started a movement in both the extreme East and West which will bear fruit as surely and from which results will accrue as satisfactory as they have in the middle, Western, Northern and Southern states to-day. In the pamphlet in question many letters are reprinted emanating from mayors and other prominent men of different cities, interspersed with voluntary contributions over no signatures and glaring headlines calling attention to the ill effects experienced through competition in the telephone field, with a few foot notes, some of which may be accepted, not literally as intended, but were the facts in connection therewith as plainly set forth and subjected to a thorough analysis would be worthless, either as fact or argument. Let us take a few illustrations: On page 13 of the pamphlet appears the following letter:

City of Akron, Office of Mayor.
Akron, O., April 16, 1902.

Mr. J. F. Druckemiller, City.

Dear Sir:—In response to your request of yesterday in regard to my opinion upon the question of telephone competition, let me say that I believe there is no such thing as real competition between rival telephone corporations holding franchises in the same municipality. The relationship is called competition, but in relaity it is warfare to the death. The warfare ends in the bankruptcy of one company, its retirement from the scene of the conflict in defeat or its absorption by a stronger rival. Such warfare is disastrous to the companies involved and the public service. When the strife is ended the people have to pay the cost of the war. The telephone business is a natural monopoly. From its very nature it can be conducted successfully by but one company. Until municipal ownership becomes feasible, I am in favor of limiting the telephone franchise to one company and subjecting that company to rigorous municipal control, both as to rates charged for service and to methods of operation.

Trusting this will answer your query, I remain,
Very truly yours,
Wm. B. Doyle, Mayor.

Coming from such an eminent source, one would naturally pause before investing money in an Independent telephone plant located in Akron. Let us see what another authority, equally as prominent, has to say on the subject. Mr. Young, who is the writer of the following letter, was mayor of Akron during the agitation which finally resulted in the granting of a franchise to the Akron People's Telephone Company:

July 19, 1902.

Hon. Tom L. Johnson, Cleveland, Ohio.

Dear Sir:—Having been informed that there are some matters before your Board of Control in which the Independent telephone company is interested, I take the liberty to write you briefly as to what the Independent movement has done for Akron.

Four years ago the Bell Telephone Company owned the town. Its franchise was about to expire. Our citizens met in mass meeting and appointed a committee of fifty, composed of business and professional men, whose work it was to look after the interests of the telephone users in the granting of a new franchise. This committee to a man was composed to two telephone companies. It made every effort to meet the Bell people and see if satisfactory terms for the renewing of the Bell franchise could not be agreed upon. The Bell people treated the committee with disdain and contempt. Its representatives in an open meeting of the council told the citizens that this affair did not concern them nor their committee, but was a matter to be settled between the Bell people and the council; that they, the Bell people, preferred to "deal" with the latter.

It was hardly an open secret that vast sums of money were being used and that when the citizens first started their crusade asking for reasonable telephone rates and for proper concessions and restrictions in the new ordinance, the Bell people had control of the council. The fight was waged bitterly, and as a result an Independent company was formed. This company has been in existence scarcely more than two years. It to-day has at least one-third more telephones in use in Akron and Summitt county than the Bell company. It has reduced rates almost one-half and has given us a first-class service and has also compelled the Bell people to put in an entirely new equipment and to better its service. And, what is better than all, I am satisfied that this was accomplished without the giving of a single bribe or the expenditure of a single dollar corruptly.

Very sincerely yours,
W. E. Young.

Over the signature of the general manager of the Akron People's Telephone Company, under date of February 27th, 1903, I am furnished the following statement:

The Akron Peoples Telephone Company started with 600 telephones August 1, 1900, at which time its paid service began. The Bell company then had about 1,000 telephones in service. To-day the Independent list in Akron alone shows 2,436 telephones in service, while the Bell company on a conservative estimate has probably less than 2,000.

The list of the Akron Peoples Telephone Company shows at the present writing Barberton with over 500 telephones installed, Cuyahoga Falls 400, Hudson 150. The Bell people, at the time the Independent movement began, probably had a total in the three places of not to exceed three hundred and fifty telephones, and their paying list to-day is far less than that of the Independent company. Perhaps the Akron Independent company's motto, which

*Editor's Note: This is the first of a series of papers on this most important subject by Mr. Nate.

is not a bad one for all Independent exchange companies, tells the story briefly: *"Courteous treatment; reasonable rates; conservative business management and good service at all hazard."*

Unquestionably another element which has entered into the success of the Akron Independent company is its magnificent toll line service. The company is connected by long distance wires with Cleveland, Pittsburgh, Columbus, Toledo, Youngstown, Warren, Ravenna, Kent, Canton, Massillon, Wooster, Oreville, Mt. Vernon, Marion, Ashland, Lima, Tiffin, Wadsworth, Doylestown, Copley, Sharon, Medina, Hudson, Penninsula and hundreds of other cities and towns. A glance at the map covering this territory is sufficient to convince one that the Independent telephone people do not fear the Bell bugaboo of "natural monopoly;" that much hackneyed phrase made use of throughout all its literature.

As this article progresses, other prominent points in the Independent field will be considered and it will be shown that radiating throughout the surrounding territory is a magnificent network of toll lines of good construction, and

over which first-class service is being furnished, reaching many points where the Bell people do not touch and have denied service for many years. With the end of the coming season, it will be possible to talk over the Independent wires from Buffalo to Louisville, taking in all intermediate cities; it will be possible to talk from Minneapolis to Memphis, and it will be possible to talk from Des Moines to Pittsburg. This statement is not made boastfully, because of the lines already constructed over which Independent service is furnished, and because of the many new lines now under course of construction.

Referring again to the pamphlet in question, the Independent people have never claimed that two systems added in any way to the advantages of any town, city or village. On the contrary, they have demonstrated that the organization of an Independent system proves conclusively, by the largely increased list of subscribers, the benefits derived from the installation of a local plant. The irresistible impetus of the Independent movement has been retarded in some sections, by pressure brought to bear through various channels by a monopoly of over twenty-five years, its selfishness in its treatment of the people in the matter of excessive rates, depriving hundreds of thousands of subscribers in the past, of available service which should long ago have been furnished, and this arrogant and selfish policy is to-day a boomerang.

In the attacks made upon one of the most progressive and honestly remunerative enterprises of the past decade, the common enemy has not found it difficult to secure letters from prominent individuals, condemning the installation of rival telephone systems. Such letters may be due to many causes. It has certainly done no great harm to have them printed, as it does not necessarily follow that because one prominent individual condemns a proposition, other broad-minded men are going to do so, and a thorough canvass of the telephone situation throughout the United States goes to show that the Bell Company, due to its original strongly entrenched position, is still able to retain a prestige in the very large cities, while it has been hopelessly beaten in the broader field, which comprise the smaller cities, towns, villages and rural communities. This prestige has no doubt in many instances been retained through their ability to bring pressure to bear even upon so honorable a body as the aldermen and mayors of our great municipalities.

In the pamphlet referred to, we are cited to a list of coast cities that do not want two telephone systems. They are not to be blamed, as it is unnecessary. However, if the subscriber is loyal to his home interests, he prefers that the advantages of this one system should accrue to men who are a part and parcel of his own city, and, furthermore, when he stops to consider that for twenty-five years the Bell Company has charged exorbitant rates and given poor service, when it could have furnished a much better service at reasonable rates, and a larger list of subscribers, he should be more loyal in his support of the Independent Company. Under such conditions he has no desire to retain the Bell instruments, and if it were not for certain pressure brought to bear by the Bell company on prominent men of many communities, the question of two telephones would die a natural death and all telephone service would be furnished by Independent companies. It is an open secret that in many of the large towns where the Independent people have doubled and quadrupled the old-time Bell list at half the rates, the Bell people have put in telephones free and have allowed them to remain in service indefinitely. Their methods of fighting through the courts has been as unfair and, apparently, as dishonest as anywhere in the history of patent litigation. Since 1893 the Bell company has fought the Independents over patents which the higher courts of the United States have pronounced worthless, and with few exceptions there have been no suits brought against the Independent manufacturers or operators, by the Bell company or its allied interest, the Western Electric Company, which have not been decided in favor of the defendant, and if the law of the country required that bonds be furnished when bringing suit under letters patent, the Independent manufacturers could have sold a much better class of apparatus to the buyer at a decidedly more favorable price from the beginning of the movement.

Let us take a few of the cities referred to in the pamphlet in question. As a brief commentary on the situation and as a preliminary introduction, it might be well to say that from the very wide-spread opinion in 1893 and the years immediately following, as to the immense revenues secured by the Bell company through its high rentals, the Independent people made the grave error of establishing rates which were too low, particularly in cities of 10,000 people and over. This may be considered as the first mistake made. The second error consisted in an absolute want of knowledge as to the immediate effect of the growth in the telephone business at reduced rentals, meaning that an estimate for an ultimate equipment of 500 telephones doubled and went to fifteen hundred within anywhere from two to four years, and the construction was not calculated to handle this rapid increase, thus necessitating a reconstruction charge not considered in the original plans of the investors. Again, we may consider that there were no switchboards or telephones on the market at that time, of tried quality, and Independent apparatus was of a necessity largely experimental; not necessarily because the manufacturers, even at that early date, could not have given the buyer a better product, but because of the fear of infringing the much advertised, now worthless, patents owned or controlled by the American Bell Telephone Company. The immense demand for apparatus, however, gave courage to the manufacturers who saw the field opening and realizing the necessity of "taking the Bell by the horns," made many changes, and better apparatus was provided; these improvements necessarily costing an additional outlay. A little experience and the employment of eminent legal counsel threw a broad light upon the situation and the Independent manufacturing companies began to furnish the operators with apparatus which very soon eclipsed that of the Bell Company's manufacture, and it is largely due to the fact that the Independent operators have provided a better service at lower rates with twice to four times as many connections, that the movement has grown far beyond their most sanguine expectations. Another factor which has proven detrimental to the advancement of Independent telephony and one which has been far reaching in its bad effect, has been the employment of inefficient labor. This condition was not alone due to a want of knowledge of the industry, as it was to the fact that in the early days, good telephone construction and repair men were not obtainable, and it was not until after some of the best men began to desert the ranks of the Bell company, that the costly errors due to ignorance began to grow less and less. The established rates in the Independent field, based upon a possible ultimate equipment of 500 lines, when the exchange outgrew this ultimate capacity and reached a thousand or more, made it impossible to pay the class of men that should have been employed to care for its operation and maintenance, and even now there are men of this caliber who should be relegated to positions where they properly belong. It is a ridiculous proposition to intrust the care of property aggregating anywhere from fifty to seventy-five thousand dollars to the care of an individual whose services can be secured for $75.00 per month, and this has been too frequently done in the Independent field. It has only been with the introduction of modern common battery multiple apparatus that men of ability have been put to the front in practical telephone exchange work.

In Sacramento, Mayor Clark in 1902 is quoted as saying he is against any opposition in the telephone field, and that for eight years he has paid double rental for telephone serv-

ice. Inquiry will show that despite the fact that the Independent company started in the business early and was hampered by primitive apparatus and other causes, gave to the citizens of Sacramento an efficient service and more telephone connections than it had known in the seventeen years previous as furnished by the Bell company.

In San Jose, several prominent citizens object to keeping two telephones and state that an attempt to install a new telephone system would be opposed by a majority of their heaviest taxpayers. Unfortunately the movement there was promoted by speculators in the telephone field and the estimates for cost of construction were not within reason and additional money had to be forthcoming. Here, again, the rates were too low, and the apparatus was primitive, which naturally caused a stampede.

The writer happens to know a part of the history of the San Jose exchange from its incipiency and in view of the methods employed by some of the promoters of that system, it is no wonder that eventually the plant was sold out. It is to be regretted that the same determination which carried through some of our weaker plants in other parts of the country could not have obtained in San Jose and a few other California points. It is quite amusing to note that eight pages of the thirty-page pamphlet in question is devoted to showing what happened in San Jose.

I will presently name a list of cities in which Independent plants were failures, and which are to-day re-equipped with modern apparatus, and are larger and stronger than before, and this will be San Jose's experience in the near future. An Independent telephone exchange will again be established, furnishing the people of that city with a class of service superior to anything it has ever known, and it will not be so very far distant either.

Mayor Jones of Kansas City is quoted as being opposed to an opposition telephone exchange, because it would result in tearing up the streets and increasing the number of poles and wires with which the city is already burdened, claiming there would be no good result to the public or telephone users, to say nothing of the nuisance to subscribers from the operation of two systems.

Mayor Hinkle of Columbus is quoted also to the effect that business men are compelled to use both telephones, and they all consider it unnecessary.

Mayor Perry of Grand Rapids says: "I believe the telephone is a natural monopoly and that with one company one would have better service than with two."

We will deal with the situation in each of these cities in their order.

Despite the opinion of Mayor Jones, a franchise was granted in Kansas City some time ago and a magnificent plant is being installed; the streets are being torn up, a modern switchboard is about to be installed and such pole line construction as is found to be necessary in the outskirts of the city is of sightly appearance and of A1 construction. Within a very few months from the present time, Kansas City will be given an Independent telephone exchange and a service locally and throughout the state far beyond anything the Bell people have ever attempted to supply. Toll lines radiating from Kansas City and covering thoroughly the entire territory for miles around will bring into touch the merchants of that city a toll line telephone service more far reaching than accommodations of similar character heretofore furnished.

Notwithstanding the statement from Mayor Hinckle of Columbus the stockholders of the Columbus plant placed within the last six months, a contract for an entirely new exchange equipment and for the reconstruction of the plant, simply because the people of Columbus have found a more satisfactory treatment at the hands of the Independent company and have confidence in the lasting success of such a system.

A glance over the Independent telephone company's toll line map in the State of Ohio proves conclusively that Columbus is not restricted to local service, but can furnish toll service as far as ninety per cent of its citizens, who are long distance telephone users would care to converse. Later on some substantial evidence with regard to the situation in Columbus and other Ohio plants will be furnished.

Despite the opinion of Mayor Perry of Grand Rapids, in which he takes the position that the telephone is a natural monopoly, let us see how Grand Rapids feels about it and what has been done for that city by the Independent company, which did not falter, after struggling with the earlier apparatus, but made from time to time such changes and additions as were necessary to keep up with its rapidly increasing service, and within the last three months has closed a contract for an entirely new and modern exchange outfit. The construction work in Grand Rapids probably does not call for a large additional outlay, as the work has been continuously cared for with the rapid increase of the exchange. There is hardly any town in Michigan not reached over these Independent toll lines, and it will be found from the list of cities later and the number of Independent exchanges in operation at present, that there are very few points left to the Bell company in that state.

If there is anything that would give a semblance of truth to a statement that the telephone business is a "natural monopoly," it would lie merely in the ability of the Bell company to furnish service over thousands of miles of wire, but, here again, the Independent people may cope with the Bell as does the Postal with the Western Union. There is no business which may be considered a "natural monopoly" which takes from a community nearly every dollar earned, when that community can retain to its own advancement the earnings, or at least a part thereof, of any plant, and this is nowhere more true than as applied to Independent telephone exchange earnings. Experience has demonstrated this, and continues to so demonstrate. When one stops to realize a conversation over a thousand miles of wire approximates seven to ten dollars for each conversation, it must indeed be a concern of vast possibilities which can afford to talk very often at this expensive rate—a concern whose business necessitates this class of service can well afford to install regardless of any local conditions. The Bell company's long distance telephone, if they so prefer. It should be remembered that a large percentage of long distance service originates about hotels or public exchanges where it is an easy matter to make use of the public service furnished by the Bell long distance company.

With regard to the progress made in the Independent work at Grand Rapids, the following information will prove interesting:

Service for pay began in the City of Grand Rapids on July 1, 1896. At that time the Michigan Telephone Company (Bell) had 1,471 telephones in the Grand Rapids exchange, which it was generally understood from reports of the American Bell Telephone Company was the largest exchange per capita then in the United States. At that time the number of exchanges in smaller towns in western Michigan was very limited, and there are scores of toll line stations to-day where there was then no toll service. Toll rates as well as exchange rates were then very much higher than they are now. Business rates in Grand Rapids at that time were $50.00 and up; residence rates, $40.00 and up; to-day the Citizens' rates are much lower for both business and residence telephone service.

Under date of January 20th, 1903, a circular was issued by the Citizens' company, in which some interesting facts are given.

Dividends at two per cent have been declared regularly each quarter, beginning with October, 1897. By special statute, the company pays all taxes, making the dividend net to the shareholder. No bonds or mortgages have been issued and there is no preferred stock. Contracts for new

equipment for the home exchange have been made and the new building is being erected. June 30th, 1896, regular service for pay began, with 832 telephones, it then being estimated that 1,500 would be the maximum.

In 1897, telephones in service 1,976, and company busy building its system, using its entire net earnings in construction.

In 1898, telephones in service 2,339, and considerable gain in state line service, which was but slightly established in preceding fiscal year, resulting in 282 toll line points. Dividends paid aggregating $7,737.00.

In 1899, telephones in service 2,915, and dividends paid aggregated $13,493. Company purchased exchanges at Rockford, Cedar Springs, and line to Newago, Lansing and Holland.

In 1900, telephones in service 3,347, and nineteen other exchanges with 2,028 telephones and eighty-four toll stations in its own toll line system. Dividends for the year aggregated $22,971. Purchased also controlling interest in the Muskegon and Lansing plants and grew with greater rapidity than at any other previous time in its history. Efforts to acquire the stock by adverse interests were effectually blocked.

In 1901, telephones in service 6,967 in its own system; Grand Rapids having 3,588 telephones with a list of twenty-nine other exchanges, eighty-eight toll stations; 1,616 miles of toll circuits and 774 miles pole lines. Dividends paid aggregating $39,544.

In 1902, dividends were paid aggregating $56,255. The Grand Rapids exchange had 4,523 telephones, forty-three other exchanges and more than one hundred toll stations in the company's own system, with 858 miles of poles and 1,917 miles of toll circuits. Dividends paid at the end of sixth year of operation, $140,000; surplus $40,000; during which time the number of telephones in company's system increased from 832 to 10,496 and toll line system from nothing to almost 2,000 miles of circuits and 950 miles of poles.

January 1st, 1903, the Grand Rapids exchange alone had 4,924 telephones in service and balance of system increased to 7,443, or a growth in seven years from the modest beginning of 832 telephones and no toll lines to a total of 12,367 telephones in service with a toll line service of over 2,000 miles reaching more than 800 points throughout Michigan, Ohio and Indiana.

After such a magnificent showing is it to be wondered at that the success of the Independent telephone movement should have opened the eyes of the Bell company and its allied interests to its gradual and fatal loss of ground?

The Bell company has advanced no straightforward honest argument in defense of its position, which bears the signature of the company, and in its efforts to retrieve lost prestige it has resorted to threats, coercion, misrepresentation and arrogance. This is what we find throughout the record which is easily traceable through its representations to the source from which it emanates. It was Abraham Lincoln who stood before the slave block in New Orleans and said, "If ever I get a chance to hit that block, I will hit it hard," and that is precisely what the Independent telephone people are doing to the Bell company to-day.

Decisions Affecting Telephony.

By A. H. McMILLAN.

A VICTORY FOR AN INDEPENDENT TELEPHONE COMPANY.

An important victory for Independent telephony was recently won by the Louisville Home Telephone Company over the Cumberland Telephone & Telegraph Company, an older competitor, in the Court of Appeals of Kentucky. Under a franchise expressly stating that it was not to be exclusive, the Cumberland Company had enjoyed a practical monopoly in the city of Louisville until 1900. In that year the general council of that city passed an ordinance providing for the sale at public auction of the franchise to construct and operate a telephone system therein. The franchise was assignable providing the transfer was not made to any competing telephone system. It was bought by E. M. Coleman for $10,000 and assigned to the Home Telephone Company, which at once began constructing its telephone system under permit from the board of public works. The permit allowed the Home company, upon Frankfort avenue, where the Cumberland company also had its line, to erect its system upon the same side of the street, but on higher poles and above it. The Home company accordingly set up for several squares its poles fifty feet long. On returning one morning its workmen found that the night before the Cumberland company had set poles just in front of them along the street where the Home company's poles were lying on the ground, waiting to be erected, its own poles forty-five feet long. To get the ten-foot space necessary for the operation of its line, the Home company substituted poles fifty feet long, upon which the Cumberland company took up its forty-five foot poles and set fifty foot ones, again leaving the Home company only a five-foot space as before. Similar tactics were pursued at other points. The Home company sued for an injunction to restrain the Cumberland company from interfering with it and to require it to cut off its poles or make its line in the plane below.

The Home company was formed in Delaware by incorporators, most of whom lived in Kentucky. It was urged by the Cumberland company that the incorporators had evaded the laws of Kentucky to get privileges not granted there and to avoid burdens there imposed, and that they therefore should not be recognized by the courts of Kentucky nor allowed to sue in them. This contention was overruled by the court because raised by a private corporation and not by the city or state. The policy of the state, said the court, was to invite foreign capital there and under that policy the courts would not, in the absence of express regulation, shut their doors against this corporation when suing for the protection of valuable rights granted to it by a municipality.

The injunction asked for was granted, the court holding the Cumberland company's franchise not exclusive and the construction of another line of telephone upon the same side of the street merely an inconvenience that it must endure in the enjoyment of the public utilities of the city.

Cumberland Telephone & Telegraph Co. vs. Louisville Home Telephone Co., 72 S. W. 4.

THE MICHIGAN TELEPHONE COMPANY DEFFEATED.

The absorption of the Detroit Telephone Company, a former Independent line, by the Michigan Telephone Company in 1900, has given rise to a recent interesting case in the Supreme Court of Michigan. For a time after the purchase, subscribers to either system were given access to all subscribers of the other system in the city of Detroit. Then the Michigan company refused to furnish the Detroit telephone subscribers connection with the Michigan com-

pany's subscribers. After demand for such service, John Mahan, a subscriber of the Detroit company, finally asked for a writ of mandamus to compel the Michigan company to grant the connection. The ordinance granting the Detroit company's franchise provided that if the company should transfer its rights to any other telephone company, the company acquiring such rights should be subject to the terms of the ordinance and that all the obligations imposed by the ordinance should apply to any successor of the Detroit company. The passage of this ordinance and its acceptance by the company the court held to be a contract between the latter company and the city. The Michigan company bought all the tangible property of the Detroit company and its rights under the ordinance. It was therefore held as having purchased with notice of the conditions of the ordinance and bound by all the obligations of the Detroit company, including the obligation to furnish service to that company's subscribers. The writ of mandamus was accordingly granted.

Mahan vs. Michigan Telephone Co., 93 *N. W.* 629.

NO PERMIT TO OCCUPY CITY STREETS REQUIRED IN IOWA.

In Iowa, a telephone company may occupy the streets of a city with its poles and lines without the city's consent. This was recently decided in the case of Chamberlain vs. Iowa Telephone Company. The defendant's predecessor occupied the streets of Des Moines under a five-year franchise, which, when it expired, was never renewed. Residents of West Grand avenue sought to restrain the company from continuing its occupation of the street, but an injunction was refused, the court holding that a provision of the Code of Iowa, section 1324, that any person or company may construct a telephone line along the "public highways of this state" included the streets of a city.

Chamberlain vs. Iowa Telephone Co., 93 *N. W.* 596.

NO REBATE WITHOUT NOTICE, A SAFE PROVISO.

Under a contract between the Atlanta Standard Telephone Company and a subscriber, which provided that "if the service be interrupted otherwise than by negligence of the subscriber" a rebate should "be made after reasonable notice in writing to the company, but no other liability in any case attach to the company," the subscriber was not permitted to escape liability for rental because of poor service, he not having given the requisite notice.

Atlanta Standard Telephone Co. vs. Porter, 43 *S. E.* 441.

INSTRUMENTS USED IN INTERSTATE COMMERCE NOT TAXABLE.

The provision of the Political Code of Montana that every corporation "doing business in this state" as a telephone company must pay a license, in each county where such business is transacted, of seventy-five cents per year on each instrument in use, is not invalid as regards a telephone company doing business within the state, also engaged in interstate traffic, the statute being intended only to apply to instruments used solely in business within the state.

State vs. Rocky Mountain Bell Telephone Company, 71 *Pac.* 311.

SECRET TELEPHONE NUMBERS.

Do not imagine that all the telephone addresses are in the book. Many thousands of our fellow citizens who have telephones in their homes are unwilling that the general public shall know their numbers, therefore a nuisance is avoided. The telephone habit is a curse. It increases talk to a murderous degree. It makes fools of women and martyrs of men. A rich broker who had a telephone put in his house and his number in the book had to hire a boy at $7 a week to answer calls, of which there were over 150 a day. Not one amounted to anything, but friends with the habit had to ring up. Now he has a telephone, but only a few of the faithful know his number. It is not in the book.

WELL KNOWN HEADS OF WELL KNOWN HOUSES.

M. I. Berger, secretary and treasurer of the Vought-Berger Company, was born in Holyoke, Massachusetts. He spent the first years of his boyhood in the LaCrosse schools, early developing the taste for literature and science which has grown strong as his experience and education have broadened. The vacations of his school days were spent in the beautiful country side surrounding his home, and he learned to know and love every bit of beauty and nature work with an enthusiasm that still holds him.

His later education took him to Ohio, and then on to the University of Chicago, where he spent several years

M. I. BERGER.

in the work he was devoted to. Here it was that he began to gather together choice books, both rare and valuable, that made the nucleus around which his library of many hundred volumes has grown. After leaving college he was engaged in the mercantile business for a few years, but his spare time was given to his studies and to tramps and drives through his long familiar but beloved country.

In the spring of 1901, he ventured in the telephone business with Mr. M. I. Vought. The firm was then doing a supply and electrical business, as well as manufacturing telephones, and Mr. Berger donned the garments of a workman and commenced at the bottom rung in the ladder to work his way to the top. At the same time he was busily studying the authorities on electricity and telephony, and was rapidly acquiring a grasp upon the work in hand. He was also in charge of the office management and sales department.

When Mr. C. A. Sterling purchased Mr. Vought's interest in the company, Mr. Berger gave his entire attention to the office work. The business has grown to proportions

beyond all expectations, and twice during the first year it became necessary to increase the capital stock of the company and to move into larger quarters. Mr. Berger has now taken the general management of the company.

His leisure hours are given over to study and to maintaining the lines adopted during his college life, and vacation time still finds him rambling about enthusiastically through the bluffs and valleys, or taking long boating trips, which are a constant joy to him. While still comparatively new in the Independent telephone business, the congenial personality of our subject has won him many staunch friends among the hosts who are striving continually to better the conditions of present telephonic requirements.

PERSONAL

H. M. Deavitt recently made a trip to New York and other eastern points.

E. Jay Best of Sterling, Ill., has taken a position with the Stromberg-Carlson Telephone Company, Chicago.

E. R. Kilpatrick has assumed the management of the Midland Telephone Company's exchange at Adrian, Minn.

William Gray, inventor of the Gray telephone pay station, died at Hartford, Conn., on January 24, of apoplexy.

J. W. Lane of the Home Telephone Company at Joplin has gone to points in California for a three months' vacation.

Ernest Redinger of Piqua, Ohio, has been appointed manager of the Bradford Home Telephone Company at that place.

F. B. Patten, president of the Illinois Electric Specialty Company, was a New York visitor during the latter part of March.

Bayard L. Kilgour has been appointed general manager of the City and Suburban Telephone Company of Cincinnati.

W. M. Habirshaw, of the India Rubber and Gutta Percha Insulating Company, has gone to the West Indies on a pleasure trip.

W. V. Rose, superintendent of the Columbiana County Telephone Company, has resigned his position and left for points in Ohio.

Alfred Slater of Janesville, Wis., is the new manager of the Independent telephone system at Davenport, Iowa, vice Wm. Fitzgerald.

Leroy E. Brown has assumed the position of cashier and manager of the Richmond Home Telephone Company, Richmond, Indiana.

C. L. Burlingham, president of the McDermid Manufacturing Company, Chicago, has recently returned from an Eastern business trip.

John C. McCabe of Greentown, Iowa, has purchased the Independent telephone exchange at that place and will make extensions and improvements.

E. B. Overshiner, president of the Swedish-American Telephone Company, Chicago, has just returned from an extended trip through the west.

Cloyd Marshall of Chicago has been appointed superintendent of electrical machinery at the department of electrical exhibits of the St. Louis exhibition.

Thomas Casey, well known in electrical circles, has been appointed superintendent of the Manhattan Electrical Supply Company's works at Jersey City, N. J.

Mr. H. F. Sanville has been elected temporary secretary of the local committee of the Philadelphia section of the American Institute of Electrical Engineering.

Fred W. Peirce of London, Ohio, has resigned his position as manager of the Madison-Clark Telephone Company and is succeeded by W. J. Meech of Louisville, Ky.

C. E. Stinson, president of the Memphis Telephone Company, and formerly general manager of the Rochester Telephone Company, was a recent Chicago visitor.

A. E. Barter and J. B. Edwards, both of the Kellogg Switchboard and Supply Company of Chicago, have recently returned from a trip to New York and Philadelphia.

Harry C. Randall, secretary and treasurer of the Chicago Telephone Supply Company, Elkhart, Ind., was operated upon March 2 for appendicitis. The operation was a success.

L. Sands, president of the Williams-Abbott Electric Company, of Cleveland, Ohio, was a recent Chicago visitor. Mr. Sands reports an increasing demand for his company's apparatus.

Dr. J. C. Buell of Rives Junction, Mich., was a recent Chicago visitor. The doctor is an inventor of some note and his Chicago trip was made in the interests of some of his inventions.

M. C. Allen, inspector for the American Telephone and Telegraph Company in Boston, lectured on "Telephony" before the Worcester Polytechnic Institute Electrical Society on March 13th.

J. R.Tornquist, president, and C. H. Anderson, treasurer, of the J. A. Tornquist Manufacturing Company of Buda, Ill., were in Chicago during the week of March 5th on business interests.

W. J. Burns, purchasing agent for the American Electrical Telephone Company, Chicago, was in attendance at the funeral of his father, the late Dennis J. Burns, at Fond du Lac, Wis., February 9.

C. Aayama and I. Hata are making a tour of the United States for the purpose of investigating and purchasing telephone apparatus and supplies for the telehone system of the Japanese government.

Charles Ott of Cedar Falls, Iowa, has accepted the resident managership of the Central Telephone Company, Hampton, Iowa. This company was formerly called the Hawkeye Telephone Company.

Charles C. Deering, secretary of the Iowa Telephone Association and secretary of the Boone County Telephone Company, has accepted the position of manager of the Mutual Telephone Company of Des Moines.

J. H. Parrish, general manager of the Standard Telephone & Electric Company, Madison, Wisconsin, visited Chicago recently in the interests of his progressive organization, reporting splendid present business and future prospects.

H. H. Robinson of Cleveland, Ohio, has been appointed general manager of the United States Telephone Company, the long distance branch of the Federal Telephone Company. Mr. Robinson will have general jurisdiction over the entire United States.

Guy Owens, an electrical engineer of Honolulu, Hawaii, has been in Chicago recently visiting the different Independent telephone manufacturers with a view to purchasing apparatus for an Independent system of 2,000 miles to be erected the coming season in Honolulu.

Four-Party Selective Pulsating Ringing Service.

By J. C. KELSEY.

From the standpoint of an operating telephone company, it looks reasonable that four parties, each paying $18.00 per year for service over one line, is a better proposition than one party on one line at $20.00 or $24.00 per year. If the ringing is selective in nature, then all cases of eavesdropping and confliction is purely accidental and there are very few objections filed by subscribers. There is also an objection made by many subscribers that they called their homes several times and were told that the line was busy. When the party found that the telephone had not been in use all day, a complaint goes to the office. One of the most angry men that ever entered a telephone office with a complaint was made so by the operator telling him that the party was busy when the man could see his party across the street. He did not know that the man was on a party line and that the busy test was an accurate one.

In those exchanges which employ straight line ringing, the trouble ticket, "bell does not ring," is a rarity, and in those exchanges which use the straight alternating current for two party ringing, or split ringing, the ticket, "bell does not ring," appears occasionally, because there is a chance for a trouble which rather reflects upon common battery practice. But even this is not applicable to all systems, for the reason that a heating coil, in the act of going down, makes the fact known by ringing an alarm bell. But in some systems, the heat coil goes down on the grounded side of the battery, and there is nothing to indicate it readily, and not until it is reported by the subscriber can any indication be given that something is wrong. A heating coil upon dropping down, puts a ground on that side of the line, between the subscriber's bell and the ringing current. This short circuits the bell, and the bell cannot ring. A ground on a line ought ordinarily to indicate itself by making the line noisy, but in this case the common battery line is not affected. But another condition enters on repeating coil systems: When the heating coil drops down, it causes another difficulty which tells the active subscriber that something is wrong. He cannot hear, nor can he make himself heard. His telephone is muffled and drummy, and he naturally complains. The muffled tendency is caused by the short circuiting of one-quarter of the repeating coil in the cord circuit, which will only operate well when both halves are in full use, or one-half of one-half is open, and not short circuited. The switchboard man readily recognizes the trouble and looks for the ground which causes the short circuiting action. Generally it is found in the heat coil, and upon its removal, the trouble man has not only cleared the transmission trouble, but has unconsciously removed the ringing trouble. All systems are not affected this way, as they do not use repeating coils, but the coil being down has its evil effect upon ringing, and those companies who do not have alarms for heat coils could do well to instruct the men to take a daily inspection of the heat coils. When a heat coil goes down on the active or battery side it becomes evident immediately, and a permanent signal results. It is, of course, found immediately. Outside of grounds, there is nothing to disturb the selective two party, as the bells are not adjusted and do not depend upon any certain condition. But a split ringing system is not entirely selective, because the bell on the other side of the line will tap, which serves to tell the subscriber that something is going on, hence the temptation to eavesdrop. This is caused by the discharge of the condenser of the bell not to be used, on account of the ringing key opening the line and removing battery for the instant.

The systems using the four party pulsating system of selective ringing have a new addition of trouble. The trouble ticket, "bell does not ring," occupies the greatest part of the trouble program. Not only does the grounding of the line at heat coil and other places forbid the ringing of the bells on the grounded side of the line, but many new conditions enter. Particularly, the adjustment of the bell by spring, and the use of generators run by storage battery. When the battery is normal, the generator has its normal speed. As the charge of the battery advances, the voltage of the cells increase, until it is twenty-five per cent higher than normal. Naturally, the ringing generator will increase its speed, and consequently its alternating pressure, and the bells, once so closely adjusted to respond to a certain pressure, will not ring. If they are adjusted to respond to the ringing current at ten o'clock in the morning, they will not ring at night. Nearly every exchange has two generators for ringing purposes, one a five hundred volt motor side, which runs in the day time, and the battery generator that runs at night. The bells are all adjusted naturally to the day machine, and unless the night machine is giving out the same pressure as the day machine, then no one can be rung up at night.

In cities, where large street railway installations abound, the question of earth currents is a strong one. It has been observed that the starting of a large car will cause the bell to stop ringing, as it seems the increased earth current due to the starting, in some way, acts with the positive or negative ringing current, and adds or subtracts enough current to forbid the bell ringing for a certain narrow adjustment. When the instrument is installed, after placing it perpendicular for certain types of bells particularly, a good ground connection is necessary, and the instrument man, to accomplish this, taps the lead pipes in the house and wraps a wire around the gas pipe, and scrapes all connections, thinking he has a good ground without solder. Granted that he gets a good ground, he adjusts the bell so that it rings loudly and promptly. He leaves and reports to the office that this certain work has been well done. But just the moment he quit scraping the wires, oxidization set in, and the resistance of the grounded joint commenced to change. In a few days, a ticket appears, which says that the bell referred to "does not ring." He is surprised. What is wrong? Some days this bell rings nicely, another day it does not, merely giving a faint tingle. The man goes out to inspect. He gives the screw of the adjustment spring a short turn, and the bell rings loudly. All goes well for a few days, then the trouble ticket repeats the story that the "bell does not ring." The inspector goes out and tries to mollify an angry subscriber by giving the adjustment another little turn, which allows the bell to ring nicely for several days more. What is wrong?

In this case it is this: The adjusting spring does not have the power of changing its tension to meet the changed conditions of current flow due to the changing resistance of the ground connection. It takes a trip a week for the inspector to do this work, and therefore, the increased earning power of the line is offset by the increased force to keep things going. Suppose that the changing resistance of the ground was constant, then the adjustment, being constant, would meet all requirements, and the bell should ring every time. But the bell does not ring. Why? Another reason: The generator is running faster and giving a higher pressure

than it was giving when the bell was put in. Being of constant adjustment, and of small range of effort, it will not respond to the current, and a new adjustment is given. And so on, each man adjusting each instrument to the present needs of the hour, until the whole system of ringing becomes a terror to the company.

The changing conditions of the storage battery are met and counteracted by polarization cells, the generators can be run at like pressures and the ground connections can be made approximately constant and good. But they cannot be made good enough, and one thing remains. That one thing is an adjustment which has range enough to admit of all changes, to start readily, to respond each time to current of different strengths, reaching a maximum of thirty per cent. Then, as the resistance of the earth connection increases, the exact point of adjustment is shifted, but the range is there, and it acts just as if a hand was there to place the spring tension.

Usually bells are adjusted so that an eighth turn of the adjusting screw will cause the bell to stop ringing. To turn the screw through twenty degrees, either loosening or tightening, the bell refuses to operate. Such is too narrow an adjustment. A bell can be so adjusted that the ringing will continue through the turning of the screw through 300 degrees. If 300 degrees is the total range, and the screw is set on the original installation half way between the two points, so that the bell would ring with the adjustment screw anywhere between the 150 degrees and 0, which then makes it too loose to ring, and between 150 and 300 degrees, which tightens the spring too much, it is plain that whatever the fluctuating conditions during the time of ringing, the range of action is wide enough to admit of any contrary influence.

Some cities have more trouble than others regarding the accurate ringing of the bells. In some cases, it could be operating trouble, inasmuch as the operator does not hold the ringing key long enough. The peculiar construction of the bells takes some time for the ringing current to become effective, and by the time the ringer is ready to respond to the current, the source of energy has been removed. Sometimes, too, the operator does not depress the key firmly and allows an intermittent current to pass through the bells which will not pick up the relay, and thereby bring the ringers into play.

There is no reason why the system cannot be operated successfully, but when one considers the class of talent usually desired by large operating companies, and the manner of their education, it is not to be doubted for one moment that any system operating the four-party pulsating system will have more trouble than they wish to acknowledge. From an engineering standpoint, it is a successful system, but from an operating standpoint with the talent usually employed, it will not give the best of service.

A UNIQUE INVENTION.

For a period of time covering, perhaps, three-quarters of a century the steam railroads of this country have been constantly on the lookout for a device or contrivance that would positively guard against the possibilities of rear-end collisions, derailment at open switches and numerous other ways or causes of destruction to human life and property.

Money to the extent of millions has been spent in experimenting with various safety equipments. Electrical devices by the hundreds have been tested, but only to find that the greatest safeguard yet found is a strict compliance to railroad rules.

However, it is due to the inventive genius of parties in Berlin, so says Consul General Frank H. Mason, for the production of a device that has proved itself to be by actual test an entire success, and that it is liable to come into actual use universally in Germany and other countries.

Mr. Mason says: "Midway between the rails is laid a light third rail of the ordinary T pattern, the joints of which are so connected as to form a continuous conductor. Midway under the forward part of the engine is hung the working instrument, an electrical apparatus inclosed in a square case or jacket, occupying a cubic foot of space.

"This instrument is connected with a contact shoe, which slides along the third rail, and by wires with a telephone and electric alarm bell in the cab on the engine and a red lamp which is lighted by the same impulse that arouses the alarm bell into action. A further improvement sets the brakes on the train simultaneously with the alarm signal. The apparatus is so adjusted and arranged that the engineer can, by touching a lever, satisfy himself that it is in working order.

"The tests on November 12 were conducted on the main line from Frankfort to Hanaw, between the stations Sachsenhausen and Goldstein, and a translation of the official report will illustrate concisely the working of the apparatus.

"Two locomotives, numbered respectively 290 and 1420, had been equipped with the new device, and the experiments proceeded as follows: Engine 290, drawing a special train and approaching Sachsenhausen at full speed, received the danger signal and came to a full stop; the driver of 290 then asked by telephone the cause of the signal, and received from the keeper of a grade crossing, half a mile in front, word that a wagon had broken down in crossing the track, and obstructed the line. After ten minutes' wait the engineer of 290 received word by telephone that the obstruction had been cleared away, and thereupon resumed his trip.

"In the tests to prevent collision, engine 1420 came up rapidly from behind, and on the same track as 290, which had slowed down and was proceeding cautiously in consequence of reported danger in front. The moment that 1420 came within 1,093 yards of 290, the signals on both engines began to ring and their red lights to glow. Thereupon 1420 halted, the driver inquired of 290 in front the cause of the alarm, and a complete understanding was immediately established between the two trains.

"The invention has other minor points of usefulness, but the foregoing will be sufficient to indicate the general method of its operations, and the measure of its efficiency.

"In effect, it puts the engine driver of every train into instantaneous touch with other trains, switchmen and station and crossing keepers in his neighborhood, and keeps ever before his eye and ear, an automatic and infallible signal, which springs into activity the moment his locomotive, whether running forward or backward, comes within the radius of danger from collision."

WASHINGTON TELEPHONE CONTROVERSY AT AN END.

The five years' fight between the local telephone company and the Subscribers' Association, it is believed, has come to a close. The repeal of the law fixing the annual charges for telephone service will follow. That law reduced the maximum annual rentals about 50 per cent. The company declined to accept the law, but subscribers who tendered the amount fixed by law obtained injunctions to prevent removal of the telephones.

Finally, pending the settlement of the question, the company extended to all subscribers the promise to refund the excess over the amount named in the law. The Senate District Committee was considering a proposition to repeal the law, and the proceedings were interrupted by the offer of the company to pay all costs of the litigation and refund one-half the excess of tolls collected, on condition that the association withdraw its opposition to the repeal of the law. The association accepted. The amount to be refunded is upward of $500,000.

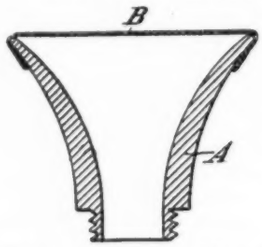
DIGEST OF TELEPHONE AND KINDRED PATENTS

Conducted by EDWARD E. CLEMENT.

FEBRUARY 17, 1903.

720,783—C. W. Clough, Antiseptic Attachment for Telephone Mouthpieces.

This invention consists of an antiseptic or sterilizing adhesive wafer stretched over and covering the end of the

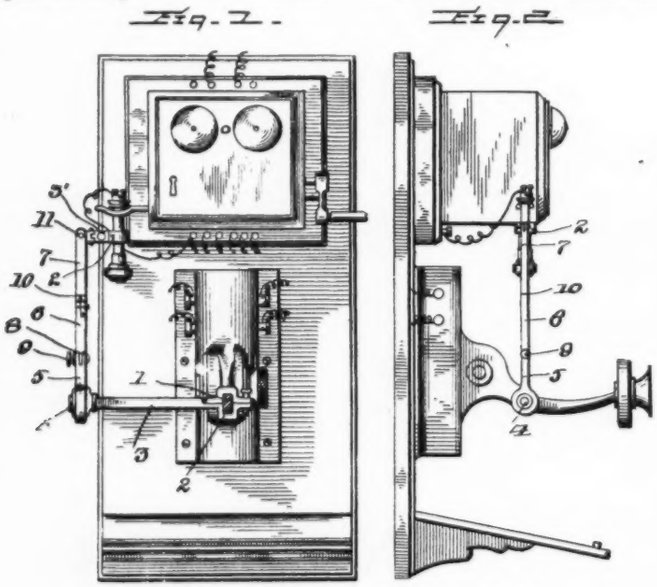


720,783—ANTISEPTIC ATTACHMENT FOR TELEPHONE MOUTHPIECES.

mouthpiece, and attached thereto by having its edges gummed or made adhesive. Fresh wafers can be applied as desired.

720,880—A. J. Briggs, Telephone Receiver Holder.

This consists of a bracket arm attached to the transmitter arm and also permanently attached at its other end to the receiver. The bracket arm is provided with joints so that the receiver can be hung upon the hook when desired, and when removed therefrom can be turned up and supported in position at the ear. In the illustration herewith

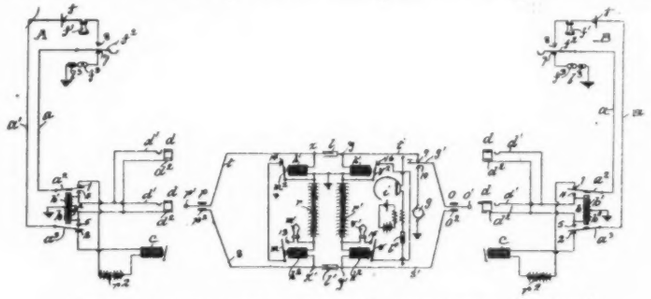


720,880—TELEPHONE RECEIVER HOLDER.

a horizontal arm 3 is clamped on the transmitter arm 1 at Q. The lower end of this arm 3 forms a pivotal support 4 for the vertical arm 5, 6, 7. This vertical arm has a knuckle joint 9 provided with a set screw, a swivel 10, and a knuckle joint 11. By means of the first two the arm may be bent into almost any shape desired, and by means of the last the telephone can be turned over and hung on the hook as in Fig. 1, or can be removed therefrom and turned up for use, the upper end of the arm then revolving about the pivot 11.

721,124—F. W. Dunbar, Central Energy Telephone System.

This is a common battery system of the well-known Dunbar type, belonging to the Kellogg Switchboard and Supply Company. Broadly speaking, the system is the same as the Kellogg two-wire multiple that is being commercially used to a considerable extent. In this system, as will be remembered, subscriber A is connected to the central office through the line a a', which terminates in the armatures a2, a3, these armatures being normally attracted against the back contracts 1 and 2, thereby connecting the line wire to the main signalling battery r2 and line relay c. To control the armatures referred to, the magnet b is provided, differentially wound and bridged across the two contacts 4 and 5, connected respectively to the springs and sleeves of the entire set of jacks for that particular line. The middle point of the windings of this magnet is grounded. The subscriber calls as usual by taking down his receiver from the hook, thereby closing the line circuit and permitting current from battery r2 to energize the magnet c. The



721,124—CENTRAL ENERGY TELEPHONE SYSTEM.

call is answered by insertion of answering plug p, which brings the line extension from contracts 4-5 into connection with the cord circuits s s respectively. Bridged across this is the main talking battery r, having one pole grounded, this being used for test purposes. In the present instance this grounded connection performs another function in addition to the test, for current will flow from the battery r through the cord circuit s, sleeve p2, test ring d2, winding b2 of magnet b to ground and back to battery. The magnet b, being this energized will pull on its armature and cut the line off from the signal, connecting it at the same time to the jacks through the contracts 4 and 5. At first glance it would seem that a differentially wound relay of this type being bridged across the line would shunt the voice currents. Such, however, is not the case, as it will be noted that the differential windings part from a common intermediate point and are located on the opposite ends of the core. It has been found that such a method of winding produces almost as much choking effect or self-induction as though the magnet was straight wound throughout.

721,559—G. W. Goodridge, Binding Screw for Electrical Connections.

This is a very simple invention. It is a binding screw comprising an ordinary machine screw with a washer under its head. The point upon which the patent was granted seems to be the means of putting the washer in place and securing it against dropping off. It will be noticed the screw has a reduced neck a. The washer is made with a small hole that will fit this neck. The problem then is how

to get the screw threaded portion through the hole smaller than its own diameter. Mr. Goodridge solves the problem by forming up the washer in cone shape, as shown in Fig. 4, when the hole will be enlarged sufficiently to slip over

FIG. 4

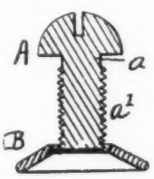
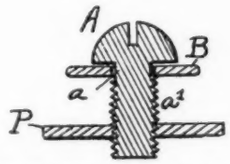


FIG. 5.

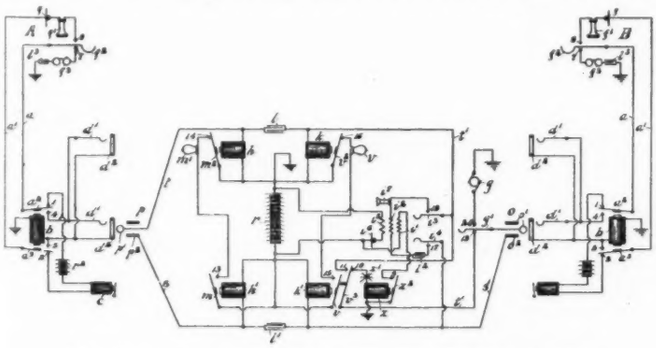


721,559—BINDING SCREW FOR ELECTRICAL CONNECTION.

the screw threads. One blow in a kick press then serves to flatten the washer under the head, as shown in Fig. 5, where it remains by reason of contraction of the hole.

Reissue 12,090—W. W. Dean, Testing System for Telephone Lines.

This is a reissue of patent 717,973, dated January 6th, 1903. The application for reissue was filed January 31st, 1903. The invention is a testing system for the Dunbar two-wire multiple referred to above. The figure herewith shows substantially the same system, the principal difference being in the mode of connection of the cut-off relay. In the case above the relay is differential, whereby both sides of the line are connected to the ground, and the line is thereby balanced. In the present case the relay is connected to only one side of line and is grounded. In such systems the test rings are disconnected from the lines and also from any source of current, so that if the tip of a testing plug is applied no click will be produced because of no potential difference from the ground. If the line is in use, however, the main battery is connected and a portion of the current is diverted directly to the operator's receiver, producing a click that is frequently objectionable to the operator, and moreover disturbing to busy subscribers, owing to a portion of the talking current being diverted. In the present case Mr. Dean uses a test relay, its armature controlling a local circuit connected with the operator's head telephone, the relay being of high resistance and impedance, thus shunting insufficient current to disturb the sub-



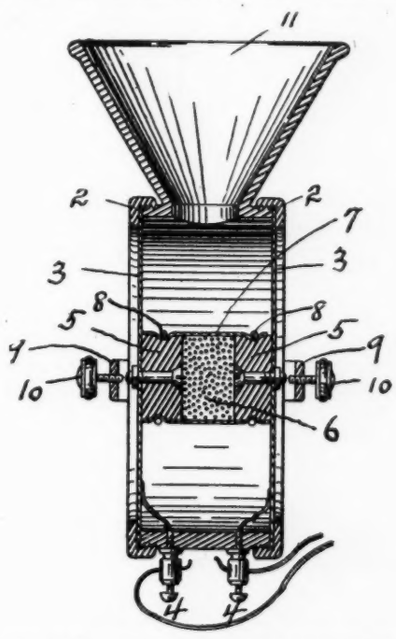
12,090—TESTING SYSTEM FOR TELEPHONE LINES.

scriber, and producing a graduated click adjusted to be loud or low as desired. One relay may serve for all the cords of one operator, or separate relays may be employed. The line circuits are as above described in connection with the Dunbar patent, the main battery being bridged across the cord circuit, however, by branches to the opposite sides of the condensers 1 and 1', each branch containing a relay h h' k k', going to supervisory lamps m and m'. In the idle condition shown, with the armature v back, the contact v3 is closed on the contact 10, the tip o' of plug o being thus connected through conductor t' to the relay x and to ground. This relay x controls a local circuit from ground through the armature x2 to point 9, to the tertiary winding i of the operator's induction coil, to the main battery r and to ground. The resistance of this circuit may be made of any suitable or desired magnitude to regulate the click due to a busy line.

In making a connection, when the answering plug p is inserted, relay x' closes its break in the circuit to lamp m'. To test, the operator touches the tip of plug o to the desired jack, and if the line is busy current comes from the sleeve through the conductor t' to the relay x and to ground. The relay x being of very high resistance and having many turns in its windings, pulls up its armature with but a trifling abstraction from the current in the busy line, and as it does so the circuit of the third winding i in the operator's coil is closed, producing the characteristic click. If the line is idle no current passes, and no click is produced. The rest of the operation will be evident from the circuit, and is the same as in the former patent and in fact in this type of systems generally. As long as the telephones are in use, current in the operator's circuit energizes the relays h h' k k', and the supervisory lamps remain dark. When the telephones are hung up relays h and k are deenergized, and lamps m' v' light. When the plug is withdrawn these relays permit their armatures to fall back, but the other relays h h' k k' let go their armatures at the same time so the lamps become extinguished and remain so as long as the apparatus is idle.

721,708—A. F. Lawson, Telephone Transmitter.

The invention in this case consists of means to project the voice into the space back of the diaphragm instead of in front of it. This is a broad statement. Stated specifically, the invention consists of a hollow cylinder having open ends upon which the diaphragms 3-3 are mounted, being retained in position by the screw threaded rings 2-2. Each diaphragm carries an electrode 5-5 and these electrodes are



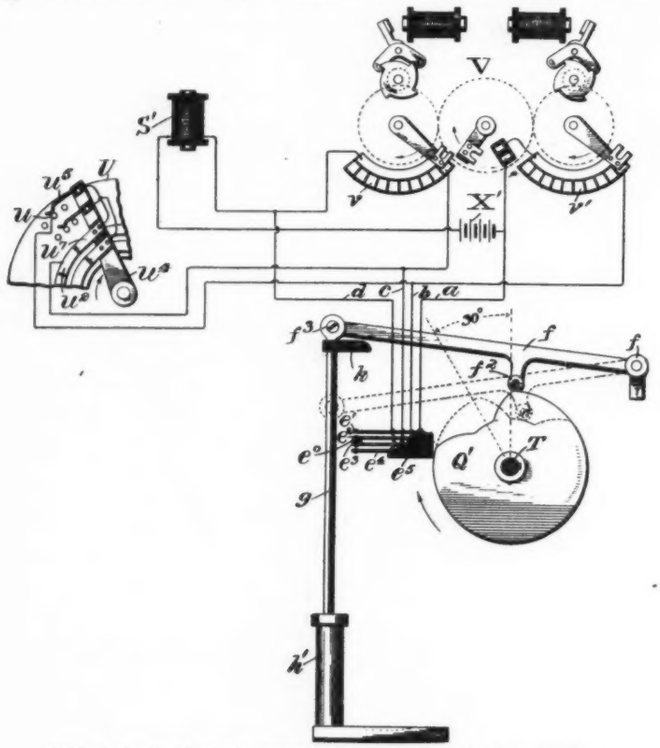
721,708—TELEPHONE TRANSMITTER.

surrounded and connected by a flexible insulated envelope 7. Between the electrodes is granular carbon 6, and outside of the diaphragms are adjusting screws 10-10 carried by bridges 9-9. The editor offers no prize for the solution of the problem, but the puzzle is to get the electrodes into the position shown, screwed on from the inside, and connected together from opposite sides of the case, all con-

nections being inside. In solving this problem the reader will please do no violence to the instrument.

721,742—F. N. Reeves, Trouble Test for Automatic Telephone Systems.

This is a trouble test for automatic systems of the type in which the so-called "Faller Automatic Operator" belongs. It seems there is a shaft called the "Master Shaft," which controls the devices of different lines during the operation of connecting by any one line, to prevent interference. This shaft starts to make a revolution whenever a call is received, and at one point of the revolution it slows down and then starts up and finishes the entire turn. Mr. Reeves is apparently afraid that some day the shaft will start and never get around, consequently he provides a very ingenious mechanism for sounding an alarm in case the motion of the shaft is retarded too much, or, in other words, in case it tarries too long. This consists of the lever p pivoted at one end and having a roller f2 intermediate of its ends which rests on the edge of the cam disc Q carried on the master shaft. At a certain angular dis-



721,742—TROUBLE TEST FOR AUTOMATIC SYSTEM.

tance around from the starting point this cam has a depressed portion which comes under the roller just at the time when the speed of the shaft is slowed down. The free end of the lever f carries a vertical rod g in the dash-pot h at its lower end. If now at the time of slowing up the shaft is retarded too much the lever will fall a considerable distance, but if the shaft proceeds on its way within a proper limit of time, the dash-pot will prevent the lever from falling very far. Below the limit of its normal movement a group of contact springs e' e° e3 and e4 are located, having their circuits connected to proper alarm apparatus. The lever has an insulated finger and in the case of its falling to its limit this finger closes the springs together.

721,817—L. Mellette, Telephone Transmitter.

Mr. Mellette has applied the old idea of tuned resonating bodies to a transmitter of the W. W. Dean type. That is to say, a diaphragm, insulated about its edge from the frame of the instrument, is formed with a depression in its center in which an electrode 15 is set, and upon the back of which a stem 14 carries a flanged cup 12 on which the tuned bodies 13 are mounted. Facing the electrode 15 is an electrode 16 carried by the stem shown secured in the bridge 18. This electrode 16, which we may call the rear electrode, is connected with the diaphragn all around by a mica washer 20, and the chamber between the electrodes is filled with granular carbon.

Without the resonating bodies this instrument would operate like the Dean transmitter of the Kellogg Company. The addition of the resonating bodies, of course, makes it

Fig. 1.

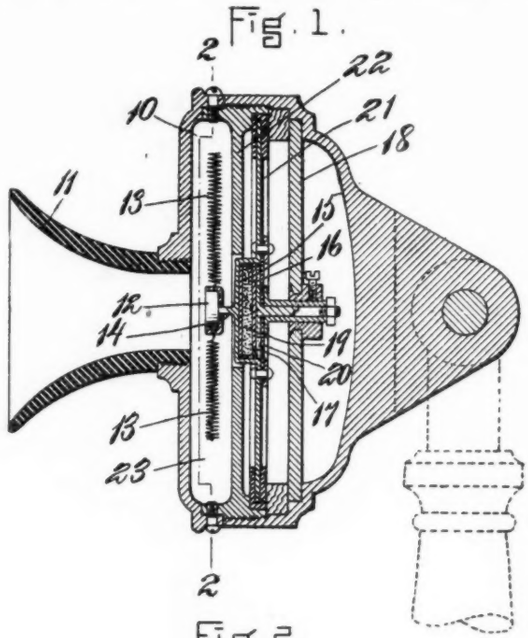
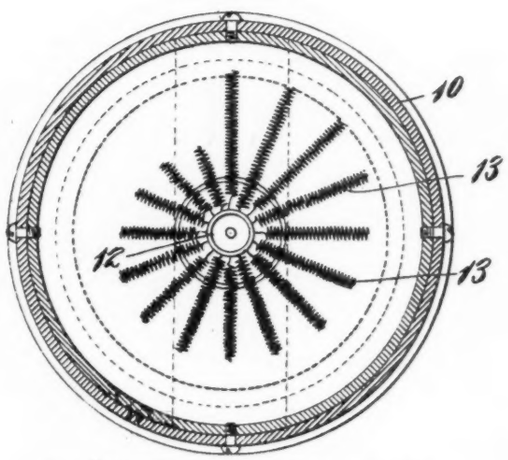


Fig. 2.



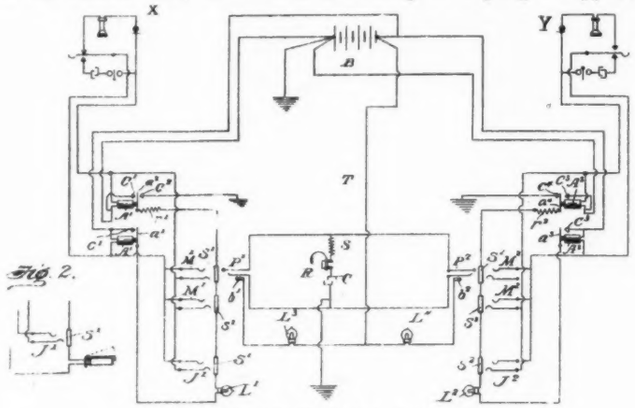
721,817—TELEPHONE TRANSMITTER.

a very different thing. As shown in Fig. 2 these bodies are of varying lengths, there being one for each note of a complete octave. In the form shown the bodies are coiled springs, but for this purpose I presume they might as well be reeds. The inventor claims great sensitiveness for his instrument.

721,882—S. B. Fowler, Telephone System.

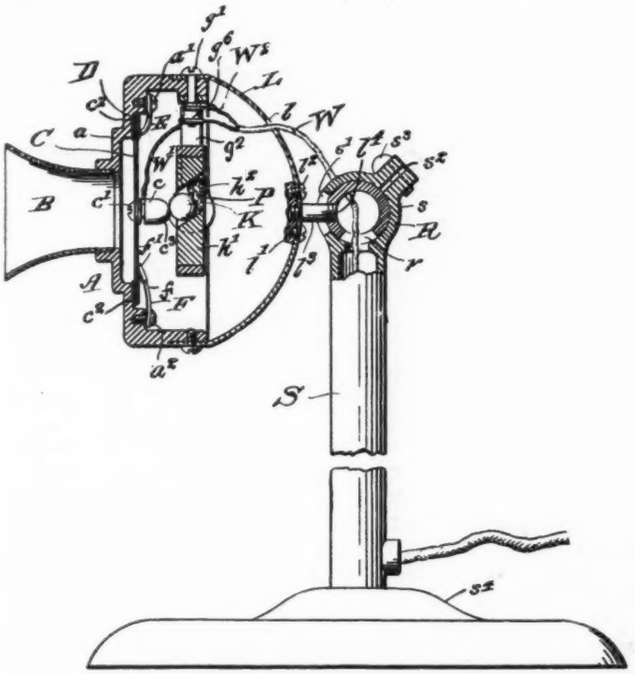
This is a common battery telephone system, in which the potential of the test rings is raised by the act of the subscriber in calling, and in which the insertion of the plug is not required to connect talking battery. The main battery is shown at B. Subscriber X has line wires passing from his station to central office and there connected through the relays A'-A' to the two sides of the main bat-

tery B. Extensions of the line wires pass to jack springs M M′ J′. The relays have armatures both included in the local circuit a′ L. S′ r′ a2. When the subscriber calls both these armatures are pulled up and close on the contacts c′-c′, which are connected to the battery circuit. Battery contacts c′-c′, which are connected to the battery circuit. Battery current thereupon flows through local circuit mentioned and through the line lamp L′, which lights. The main battery is grounded on one side, and as the test rings s′ are included in this local circuit along with the line lamp, they have a potential difference from the ground, which is utilized by grounding operator's telephone set R as shown, on the sleeve side, so that when the tip of a plug is applied



721,882—TELEPHONE SYSTEM.

to the jack thimble s′ of a busy line the characteristic click will be produced, even though no plug be inserted in any jack of the line. When the plug is fully inserted the sleeve b′ of the plug comes into connection with the thimble s′ of the jack, and the supervisory lamp 13 is connected from the ungrounded side of the battery by way of the wire T



722,021—TELEPHONE TRANSMITTER.

through the lamp and the sleeve bl to the test thimble and back to battery by way of the armature a2. This is also the course for the return current from the lamp L, the armature a2 being the common return for these two lamps. The supply of current through this common return is limited by the resistance r′ and is insufficient to light either lamp when both are thus in circuit. Therefore the moment the plug is inserted both lamps are out. When the subscriber finally hangs up, the line relays let go their armatures, and the armature a2 falls back on the grounded contact c2, whereby current will again flow through lamp L3 by way of the plug sleeve and test thimble and the armature a2 to ground, for clearing out.

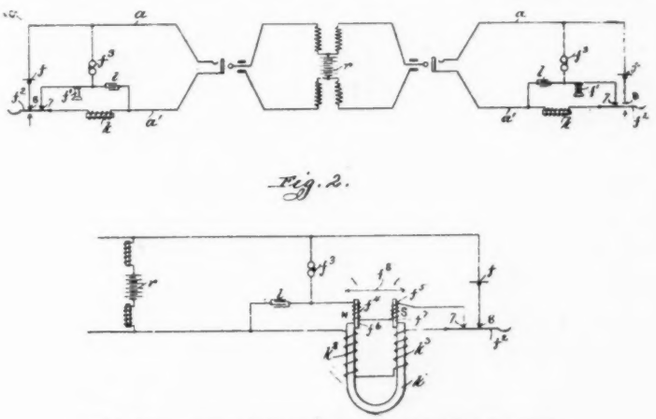
722,021.—Chas. Holmok, Telephone Transmitter.

This is a single contact, solid carbon transmitter of the old Berliner or Clamond type. The diaphragm C carries one electrode, c, firmly attached to it, while an adjustable brass ring carries a carbon disc h′ provided with an inclined opening in which rests a carbon ball so as to press against the front electrode c. This ball is kept from falling out by a quantity of raw cotton or similar material P. By adjusting the inclination of the carbon disc h′ the inventor says one may achieve very delicate differences in the amount of pressure between the ball K and the electrode c. Thus the instrument may be adjusted "for either short distance or long distance" work. The shell is carried on a stem pivotally mounted in a split collar R provided with a clamping screw f3, so that the whole instrument can be turned up or down.

MARCH 10, 1903.

722,212.—W. W. Dean, Subscribers' Telephone Circuit.

This is the Kellogg subscribers' talking circuit. Battery current flows over the line a-a′ to and from the subscriber's station through the choke coil k and the transmitter f. The choke coil is shunted by the bell circuit containing condenser l and the receiver f′. The ringer f3 is bridged across from a point behind the condenser to the conductor a. When the hook is down no battery current can flow from central over the line, and ringing current will pass by way of line wire a, ringer f3, condenser l, and line wire a′ back to central. When the hook goes up battery current flows out from central over the line and through the subscriber's station

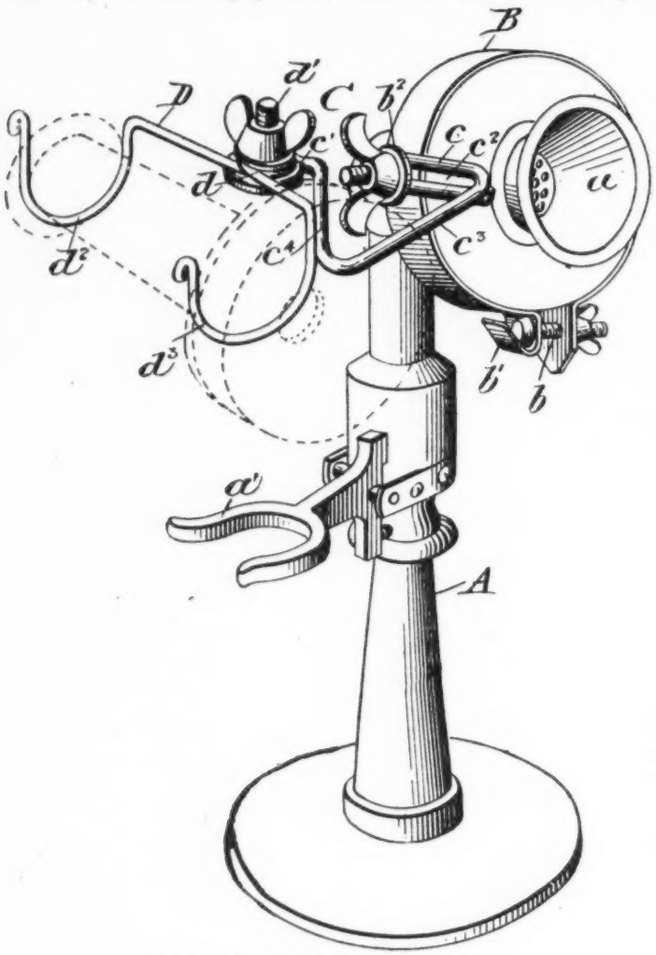


722,212—SUBSCRIBER'S TELEPHONE CIRCUIT.

as described. Disturbances due to the transmitter f are propagated over the branch circuit, including the receiver and the condenser, and the line wires a and a′, no speech currents going through the choke coil k, on account of its high self-induction. A modification of the circuit is shown in which the separate choke coil is dispensed with, and energizing coils are wound upon the pole pieces of the receiver magnet, being connected in the line for the same purpose as the choke coil k. Mr. Dean says that in thus using an electro-magnet instead of a permanent magnet in the receiver he adjusts his diaphragm so that it will not buckle unduly when the core of the magnet is magnetized to saturation. No matter how much current is sent through the windings, therefore, say on a short line, the adjustment of the diaphragm will not be affected.

722,348—J. S. Young, Telephone Support.

This is another receiver support. It is shown applied to a desk set by being clapped on to the transmitter. B is a band clamped around the transmitter and carrying a screw bolt on which the bent wire frame c3 c4 is supported. This has a slot formed by parallel turns of the wire that upon



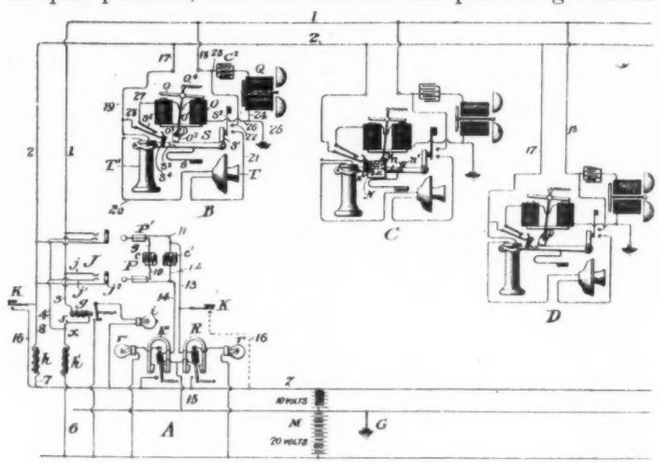
722,348—TELEPHONE SUPPORT.

loosening the thumb nut C will permit the wire to be moved back and forth to adjust it. At c a bent wire bracket D is pivoted on a screw bolt d' and secured by the thumb-nut shown. The receiver is shown resting in this bracket, being indicated by dotted lines.

722,362—C. L. Goodrum and J. W. Lattig, Party Telephone System.

This is a very ingenious and interesting lock-out party line system. Three stations are shown in the diagram connected across the line wire 1-2. Each station has the ordinary transmitter, receiver and switch hook with the ringer and condenser usually employed in common battery systems. When any switch-hook is up it bridges its telephone across the line as usual, and thereby calls central. The problem is to lock out parties from a busy line. At each station the polar magnet O is provided, included in the normally open grounded branch 17-19-28-s5-27-26-25 taken off from the line wire 2. The instant the switch hook starts to go up when the phone is taken down for use, the switch s5 is closed and if the proper polarity current is on the line wire 2, the armature o is at once thrown over to move the dog 02 out of the patch of the lock-shoulder s3 on the switch-hook, thereby permitting the latter to ascend to its limit and close the talking circuit at 22. Now, if the line is busy, the current on line wire 2 will be of the wrong polarity, for reasons to be stated later, consequently the magnet will leave its armature in the position shown and the hook will not go far enough up to close the talking circuit, being held down by the detent and dog 02.

The most ingenious feature of this system is the manner in which the change of polarity on the line wire 2 is produced when the line is busy. It will be observed that the central battery M (which supplies the entire exchange) is divided at a point intermediate of its terminals into two unequal portions, and this intermediate point is grounded.



722,362—LOCK-OUT PARTY LINE TELEPHONE SYSTEM.

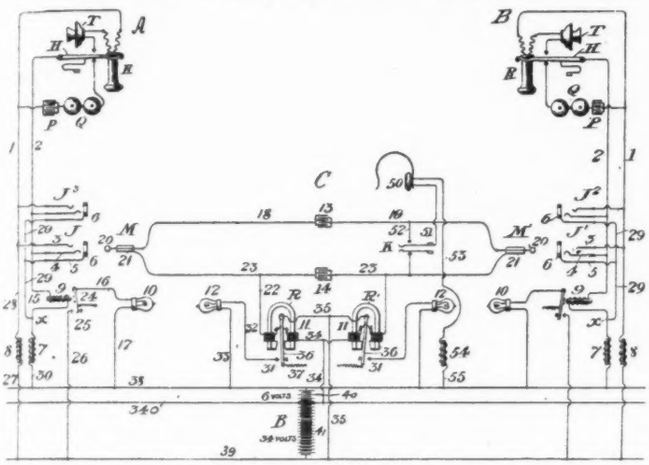
As shown in the illustration herewith the smaller division may be of 10 volts, and the larger division of 20 volts potential. This means that the difference of potential between line wire 1 and the ground is 20 volts negative. The smaller line wire 2 is at 10 volts positive potential above the ground. Now, then, if any station calls in, and gets possession of the line, the two line wires become connected through a low resistance path by the telephone instruments at that station. Thus the negative 20 volt potential on line wire 1 is superposed on the positive 10 volt potential of line wire 2, and the latter immediately becomes negatively charged to the potential of 10 volts. After this has happened no one else can get in on the line, as previously noted. The simplicity as well as the certainty of operation of this system are admirable, the conception of obtaining difference of sign as well as of potential in this way by simply shifting the central office ground being particularly striking.

722,367—J. W. Lattig and C. L. Goodrum, Telephone System.

This is a common battery system invented by the same parties who shifted the central office ground as referred to above. It also has some striking features. The problem they set themselves to solve is this: Without complicating the spring-jack, and without using extra switches, how is it possible to maintain the supervisory signals normally inoperative, to retire them during conversation, and to make them operative at all other times during a connection. A scheme of polarities was finally adopted which bears some relation to that involved in the last patent above. The central office battery is divided here also, this division giving six volts on one side and thirty-four volts on the other of the intermediate point. The cord circuit is divided by condensers 13-14 in order to separate the two halves for signaling purposes. Connected to each half of the cord circuit 23-23 are the windings of a relay R or R', these relays being connected on the other side to the intermediate point of the divided battery. Both relays are polarized and have retracting springs to their armatures which serve to keep the armatures in position to open the circuit of the supervisory lamps 12-12. Thus the first condition is attained.

When a plug is in a jack, current flows in one direction

through the six volt division of the battery by way of bus-bar 38, wire 30, coil 7, wires x and 29, spring 5 of the plug, cord conductor 23, and wire 22 to the relay coils and so back to battery by bus-bar 340. This current is in the proper direction and is of sufficient strength to reverse the armature's position and close the lamp circuit. When the subscriber answers he bridges the two sides of line together and as in the case of the party line the higher potential over-



722,367—TELEPHONE SYSTEM.

comes the lower one and the polarity of current through the relay windings is reversed, whereby the armature is again thrown over and the lamp is extinguished. When the subscriber finally hangs up his receiver, current from the small battery resumes its sway and the lamp is again lighted.

It will be observed there is no complication in any of the apparatus, and that no other battery connections are disturbed in the slightest degree. The only change that is made to effect the result is that of polarizing the supervisory relays, which in practice it seems is very simple.

A FORM OF TELEPHONE FRANCHISE.

One of the chief questions which presents itself to those desirous of organizing, equipping and conducting telephone exchanges is that of obtaining from the proper authorities a franchise so to do.

Every corporation obtains from the sovereign power under which it is created certain rights and privileges known in the law as franchises, but a franchise of the nature required for the purpose under discussion is of a somewhat different origin, and co-partnerships and individuals may obtain the same equally with corporations.

Every municipality is to a certain degree a sovereign power, and as such may grant specific and exclusive rights and privileges. Such specific and exclusive rights and privileges are generally indicated by the word franchises. Perhaps it would be quite impossible to set forth a course of procedure which could be followed to success in securing these franchises under all circumstances. But it may be said in a general way that municipalities are not bound as a matter of course to grant franchises, and hence in proceeding to obtain them the usual procedure is by petition. This petition is required to be in no particular form, care being taken only that it sufficiently sets forth the object and desires and the concessions on the part of the petitioner. If to be done by a corporation it is always desirable that such corporation should have been duly formed and consequently in a position legally to make this petition on its own behalf. It may be said in passing that it is quite customary for the petitioner to have an ordinance drawn and to embody a draft of the same in the petition.

If the municipality desires to grant the franchise an ordinance is presented, and upon being passed by the proper authorities and accepted by the petitioner, fixes the rights of both parties. In other words, a franchise depends upon a contract, the terms of which are embodied in this enactment of the municipality called an ordinance.

No suggestions as to contents and form of such ordinances could here be made which would be comprehensive. But a draft is here appended which, it is hoped, may in some measure be of interest and assistance to our readers. It is to be borne in mind, however, at all times that each town or city will necessarily have its own peculiar features which must be taken into account in the drafting of the particular ordinance for use therein.

AN ORDINANCE.

To grant to the A. B. Telephone Company, their successors and assigns, the right to construct, operate and maintain an independent telephone exchange and appurtenances in the city of C., in the county of D., state of E.

Section 1. Be it ordained by the Mayor and Board of Aldermen in the said city of C.: That the right, franchise and privilege is hereby granted to the said A. B. Telephone Company, their successors and assigns, to construct, operate and maintain upon, along, through, under and in the streets, lanes, alleys and public places of said city, all necessary poles, posts, conduits, cables, wires and other suitable material and appliances necessary to operate a successful telephone exchange in and about said city for a period of ——— years.

Section 2. Be it further ordained that all rights and privileges hereby granted are made subject to the following conditions, to wit:

All poles and posts used by the said A. B. Telephone Company, its successors and assigns, shall be reasonably straight, and at points where there is unusual straining shall be stayed in workmanlike manner, and at all points shall be so placed as not to interfere with travel or the ordinary use of the streets, or with any other exercise of the necessary rights and privileges of the said city of C., as a municipal corporation.

Section 3. Be it further ordained that said A. B. Telephone Company, its successors and assigns, shall be wholly responsible and liable for any and all damages that may be adjudged against the said city by reason of the erection, establishment, location and maintenance of all poles, posts, wires and conduits, or any and all damages arising in any manner therefrom, and that an exercise by the said A. B. Telephone Company of the rights herein granted shall estop said company from denying the acceptance of this ordinance and all conditions thereunder.

Section 4. Be it further ordained that said parties, their successors and assigns, shall in erecting said poles and posts, and in constructing said conduits, if any, disturb sidewalks and pavements as little as possible, and shall at all times after erecting said poles and posts, and constructing said conduits, wires and cable, replace all streets and pavements so disturbed by them, and leave them in equally as good condition as they were before being disturbed.

Section 5. Be it further ordained that the council reserves the right to use free of expense to the city upon the poles herein provided for as much space as may be necessary for the stringing and maintenance of wires for police, fire alarm or other municipal purposes, provided that such wires shall not interfere with the proper use of the wires of the said A. B. Telephone Company, and shall be so placed and maintained under the direction of said A. B. Telephone Company, but wholly at the expense of the said city.

Section 6. Be it further ordained that if at any time in repairing streets or sidewalks it shall become necessary to change or remove said poles or wires, it shall be done when ordered by the city authorities by said A. B. Telephone Company, their successors and assigns, at their own expense.

Section 7. Be it further ordained that said party, their successors and assigns, shall furnish for the use of a city

free of charge, to be placed under the direction of the City Council, as many as —— telephones connected with their exchange in said city.

Section 8. Be it further ordained that none of the rights and privileges granted under this ordinance shall be transferred to any rival or competing company, co-partnership or individual, without thereby affecting a complete forfeiture of all rights herein conferred.

Section 9. Be it further ordained that upon an acceptance of this ordinance said party, their successors and assigns, shall enter into a bond in the sum of —— dollars. That they will construct or cause to be constructed an Independent telephone exchange in the said city with an ultimate capacity of —— telephones and drops.

Section 10. That the said A. B. Telephone Company shall not charge for the use of any telephone within the city limits more than —— dollars per year for each business telephone, nor more than —— dollars per year for each residence telephone.

Section 11. That one of the conditions of this ordinance is that the said A. B. Telephone Company shall have done certain of the work contemplated herein upon the entire system, and shall have completed the same to a point where it shall have in successful operation not less than ——telephones within —— years, —— months from this date, and in event of the failure so to do shall thereupon forfeit all franchises, rights and privileges hereunder granted.

Section 12. That the said city will extend the protection of its police power for the protection of the franchises and personal property of the said A. B. Telephone Company, and will enact such ordinances as may be necessary from time to time to carry this provision into effect.

Section 13. Be it further ordained that nothing in this ordinance contained shall be taken as an intendment to interfere with the vested rights of any individual, co-partnership or corporation.

Section 14. Be it further ordained that this ordinance take effect at once upon its passage and publication according to law.

PRACTICAL TELEPHONY

Conducted by P. Kerr Higgins, A. M. I. E. E.

ARTICLE V.

In practice, it is usually found that the drop or line wire can be run to a point within easy reach of the inside wire, but where congested conditions exist, as in a large city or large buildings, special arrangements will have to be made.

All connections between drop and inside wire must be thoroughly soldered, except where a testing block with screw and washer is used. Personally, I prefer a testing block which requires the wires to be soldered. It is not so convenient, but in modern systems having common battery it is absolutely necessary that all connections be made as solid as possible to avoid corrosion.

Drops.—All drop wire should be insulated and be as short as possible, and in no case should the inside wire extend to the outside unless weather-proof. It is becoming common practice to use No. 16 weather-proof duplex hard-drawn copper wire for drops. This makes very neat work, but is open to the objection that there is great possibility for trouble, due to the moisture collecting at the twists, causing corrosion and consequently trouble, more or less intermittent and difficult to find. When duplex is used, or straight single wire, it should be fastened to a No. 5 porcelain knob and tied in.

Protection.—As a rule protection is not absolutely necessary at the telephone, but circumstances must decide this. When a protector is found necessary it is well to use a combination arrester having heat coils 3-10 amp. for sneak currents and an air space lightning arrester, composed of two carbon blocks separated by a thin sheet of silk or mica, one side of each pair being connected to each other and to ground, while the other side is connected to line and instrument. If a fuse is found necessary a one and one-half ampere will serve all ordinary purposes. The whole is generally mounted on a tablet.

Distribution.—Distribution, generally speaking, consists of an underground cable box and branch boxes. Where the wire has to be carried from the sub-station to the branch box along buildings, bridle rings, permitting additional wires to be slipped in afterwards, are used. These are made of iron and finished in granite. The wall is usually plugged and the rings screwed into the plug, but when this cannot be done wooden blocks may be used and nailed to the wall and the rings screwed into the blocks. When the weather-proof wires pass over obstacles, they should be protected, using a piece of old rubber hose. The connection between the main and branch boxes is usually made by means of okonite cable. This is fastened to the buildings with pipe straps three-fourth of an inch for twenty-five pair and one inch for fifty pair cable, being located every two feet. Where it is necessary to cross an open space, a messenger wire is strung, No. 6 iron will generally serve for this purpose, the cable strung on it being held in place by cable hangers every two feet.

All cable hangers and pipe straps should be galvanized except where Marlin or zinc is used. The okonite cable is put in 10, 25, 50 and 100 pairs, and is made weather-proof, each wire being covered with a rubber compound and twisted in pairs. They are then grouped and protected with jute saturated with resin oil and then covered with tarred tape or braided. The size of the conductor is usually No. 19 or 20 B. & S. All work of this character should be carefully and neatly done, and so arranged as not to obstruct windows, doors and fire escapes.

Cable Boxes.—All lumber used in the manufacture of cable boxes should be of the best selected yellow-leaf pine, free from all defects. All metal fittings should be thoroughly galvanized and painted. As in the case of braces, it is well to test the galvanized iron by immersing it in a solution of sulphate of copper and wiped dry. If a copper deposit is found on the iron or the galvanizing is rubbed off or loosened, it should be rejected. The box should be made large enough to hold the standard strip, whether for 25, 50 or 100 pair, as the case may be. The box should be fastened to the pole by six inch bolts by three-eighths inch in diameter. Hinges of almost any kind may be used, but the four inch strap hinge is the most popular. The front and sides should be divided and hinged so that the door and sides will part together; the door is usually opened from the center of the box to the left and right.

It is customary for protection to lock all cable boxes. The box must be roofed and project over the sides and front, two inches. It must be screwed together and not nailed and one and one-half inch lumber used throughout.

It is not necessary to bore the holes for the cable until ready for use, and cable in all cases should enter from the bottom of the box. The box should be painted with two coats of white lead and rendered waterproof, the painting being both inside and out.

Cables.—Wherever possible, underground or aerial cable should be used in preference to aerial wire. It is more expensive at first, but the mainetnance is much less and the service greatly improved. Cable work may be divided into three classes, aerial, underground and subagua. In ar-

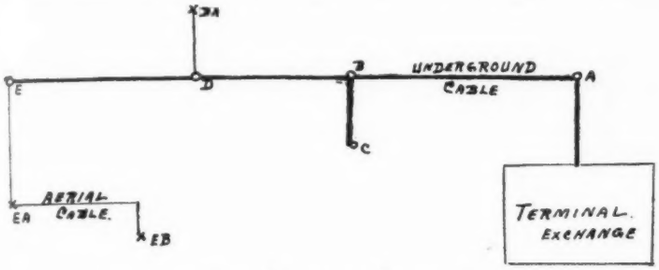


FIG. 1—CABLE (MULTIPLE) DISTRIBUTION.

ranging cable distribution, routes should be so laid out as to allow a maximum of six cross-arms for aerial wire. When the demand is greater than this, cable should always be used, and wherever possible underground cable, especially in all the down-town districts and on fine residence streets.

The real economy of using cable is now admitted and the results are permanent in that the amount of trouble is reduced to the minimum. Aerial cables have been strong favorites, for the reason that they are easily and cheaply erected, more easily repaired and virtually no loss on being taken down or replaced. In laying out cable distribution, a map should be made showing actual and prospective subscribers. The main cable feeders are then marked, as are also the branches with the cable poles. These should have distinctive marks, as in Fig. 1, a circle for underground and a X for aerial.

Two systems are used, direct and multiple distribution, but modern practice favors a combination of both. When multipling is done the cable should be dead-ended, with a pot head in the cable box, in preference to using a branch splice. There are exceptions to this and judgment must be exercised in deciding, taking into consideration the convenience of testing, etc.

In providing for future growth an allowance of twenty-five per cent should be made for small groups and five per cent for large.

In selecting the system one will necessarily have to be guided by the existing local conditions and the prospects for future development. Terminal poles should be selected with the greatest of care and with a view to having the minimum amount of aerial wire. Wherever possible, all cable poles should be bridled to the cross-arms in sets of five (Fig. 2). The numbering strip usually forms part of the cable strip (Fig. 3) and the conductors are numbered in pairs.

Cable wires are covered with dry paper in two colors, generally white and red, one of each forming a pair, the color being retained throughout. On aerial and underground cable at terminal points all the reds should be connected to the odd numbers and the whites to the even numbers or vice-versa as per arrangement, making the same provision at the cable box. This is for uniformity and also for convenience in testing and locating trouble. The pairs in the cable are twisted, making a complete twist every three inches, thus creating a perfect metallic circuit, completely neutralizing disturbances due to induction from adjacent conductors. It is preferable to use this style of cable for all purposes where efficiency is desirable, as the straight-away cable is not serviceable on long lengths, and the difference in cost is not great when results are considered. In the straight-away cable it is customary to bunch all conductors not in use, and, to avoid cross-talk, connect them to ground. The cable commonly used for aerial purposes is made up of No. 22 B. & S. gauge copper wire ninety-eight per cent pure. This is insulated with paper, twisted in pairs, one twist in every three inches, then formed into a core with layers, reversed. The conductor resistance is 81 ohms per mile, and insulation resistance 500 ohms per mile. For underground No. 19 conductor is used, resistance 47 ohms and insulation 500 ohms per mile. The lead sheath should be not less than 3.32 inches thick, free from holes, cracks or defects and be made of lead alloyed with three per cent tin. All conductors should be tested separately against all others, and also the sheath. It is customary for makers to allow from two to four per cent extra conductors to take place of any defective pairs. Full capacity of cable should be guaranteed by makers.

Suspending Cable.—In suspending cable, a one-half inch suspension wire made up of seven strands, having a breaking strain of 10,000 lbs., is used for cable from twenty-five to one hundred pairs. Hangers are usually placed every

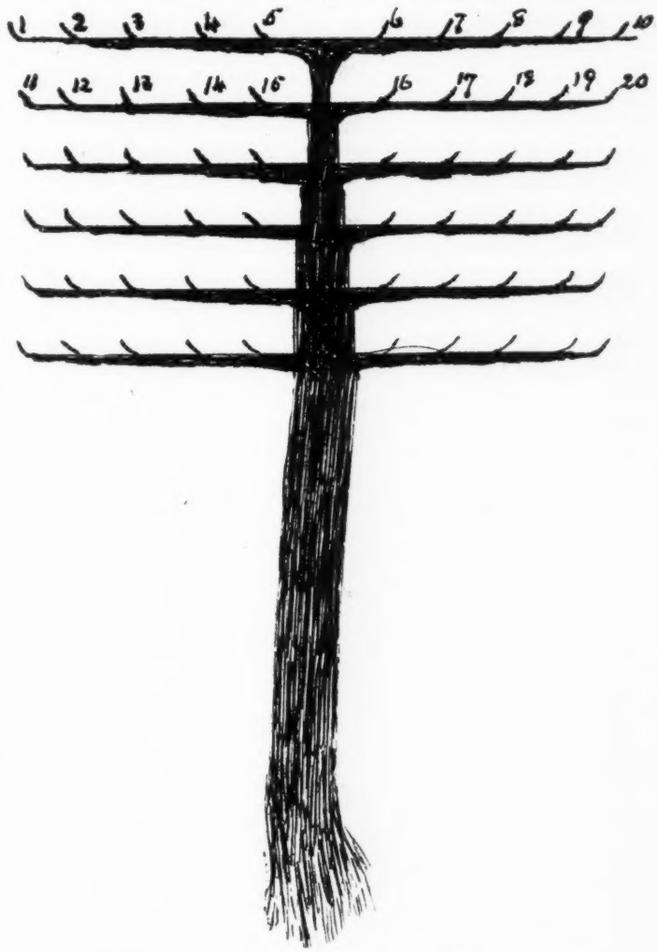


FIG. 2—CABLE BRIDLE WIRES.

twenty inches. The sag allowed should be as nearly uniform as possible, and the following will give some idea of the allowance to be made: Eighty feet span, six inches; one hundred feet span, ten inches; one hundred and twenty feet span, fourteen inches; two hundred feet span, thirty inches. In erecting the cable, a wooden pulley is placed at the first pole, below suspension wire, carrying the cable smoothly. The cable is wound on a reel and mounted on a cable truck, so arranged as to permit the reel to turn clear of the ground at least six inches. The cable is allowed to pass off the reel always from the top and the reel is placed about

twenty-five feet from point of first contact between the cable and the fixture.

Aerial cable is usually pulled in by capstan. The erection of cable must be done with great care, not only to prevent breaking the sheath, but also to avoid unnecessary strain on the conductor. One-inch rope, or seven-sixteenths steel rope, soft core, is used for this purpose and is lashed to the cable with short lengths of wire, the end of the rope being first lashed to a swivel and this, in turn, to the cable. The shorter lengths of wire are passed through the swivel, then twisted alternately around the cable sheath, the ends being twisted tight and cut off. This is repeated until several strands have been used, twists being in alternate directions, when a binder is woven through the various strands near the swivel and twisted tight and cut off.

The disposition of the men may be made as follows: One man at reel, two men attending to cable hangers, one man hanging cable to guide wire, two men on first pole to unhook cable and put cable in pulley, two men at winch and one man on each pole. When cable ends are to be spliced, a lap of at least three inches should be allowed and splices located as nearly as possible to poles. As the cable is passed off the reel it should be examined for defects. It is necessary to keep the ends of all cable sealed up, whether the cable is in the store-room or outside.

Guying.—In locating anchor rods, it is well to place them pounds each. All anchors should be in place before the suspension wire is run and be double the strength of the latter. When necessary, two or more anchors may be fastened

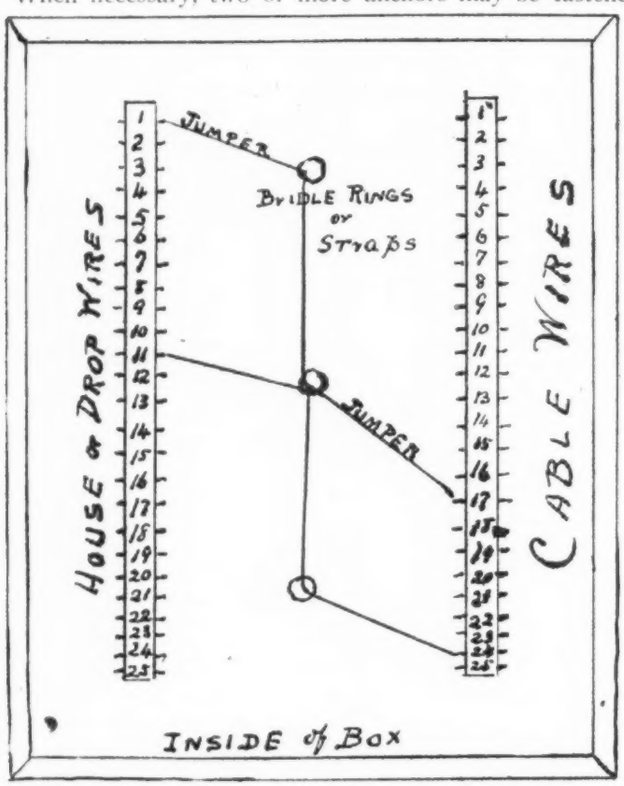


FIG. 3—CABLE BOX CROSS CONNECTING METHOD.

at an angle of about 45 degrees. The anchor rods should be flawless, one and a quarter inches in diameter and of one piece. All poles should be properly guyed against the strain caused by pulling in the cable. See Fig. 4. The ends of the suspension wire should be firmly guyed to an anchor placed in the ground; this is very important. The custom of using head guys is useless unless the end is firmly anchored in the ground. The end anchor logs should be large, say from ten to twelve feet long, and at least a foot in diameter. The size and depth will, of course, depend on the strain and the nature of the soil. The log sunk from eight to ten feet in firm soil will support ten cables, having a strain of 3,000 to one pole. The log should never be set in the same direction as the pole line, but always at right angles to it. It will be observed from Fig. 2 that the nearer the anchor is to the pole the greater the strain it will carry. There are many instances where it is impossible to anchor right at or near the pole, and in such cases the suspension wire may be ex-

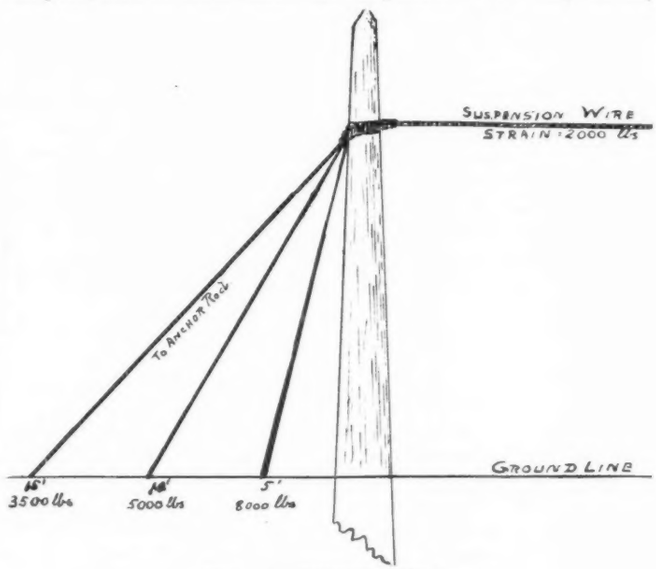


FIG. 4—GUYING POLE.

tended to a short pole further back and dead ended there, anchoring the short pole.

In anchoring, the pole or guy stub should be given a slight lean towards the anchor in order that the work when completed will receive the strain uniformly and the pole will be as nearly perpendicular as possible. In pulling in the cable, lengths of 1,000 feet are long enough to be handled at one time, for in pulling longer lengths there is liability of injury to the conductors. The cable having been placed, it is well to have a man ride over it on a cable car, straighten out the hangers, make them uniform and hook any that may have become unhooked.

After completion of the cable it should be carefully tested for continuity, conductivity, insulation and capacity.

ITS POSSIBILITIES UNLIMITED.

At a small dinner in Philadelphia recently, according to an eastern paper, the guest of honor was a young married woman, formerly a resident of "the West." She is the proud mother of two fine boys, both under four years of age. In their education she endeavors to follow a system, like many other young mothers, and she is very careful to live up to any rule she may have formulated for them. During an early course in the dinner, and in the middle of an animated conversation with her host, she suddenly ceased talking. Her face took on a most startled expression. Then, finding her voice, she exclaimed:

"Mercy, I have forgotten those boys again! May I use your telephone?"

She was taken to the instrument by the host, and the murmur of her voice in most earnest conversation was wafted back to the dining room. After a short time she returned.

"I beg a thousand pardons," she said, "but you must know I have always insisted that Sam and Dick say their prayers for me before they go to sleep. In the hurry of getting off to-night I entirely forgot by usual duty. So I called up the nurse. She brought them to the telephone and they said their prayers over the wire. I feel quite relieved."

Prominent Exchange Managers

CHARLES E. STINSON.

Charles E. Stinson, president of the Memphis Telephone Company, Memphis, Tenn., is a recognized pioneer in the telephone field.

Mr. Stinson is a native of New York state and his first electrical work was in 1879 with the Edison Telephone Company at Buffalo. This company consolidated with the Bell company about one year later, and Mr. Stinson was with them until 1881, when he took employment with the Chicago Telephone Company. Later he went to Evansville, Ind., for the Cumberland Telephone & Telegraph Company, going from there to Nashville with the same company. In 1882, while the Great Southern Telephone Company was constructing the Memphis plant, E. S. Babcock, president, and J. J. Fowler, general manager, of that company engaged Mr. Stinson as superintendent of the Memphis exchange and its territorial lines. When the Cumberland Telephone & Telegraph Company absorbed the Great Southern he continued in the same capacity until the summer of 1884, when he took service with the Pennsylvania Telephone Company at Reading, where he was engaged in the management of exchanges and toll lines. June, 1885, to September, 1887, he was with the Bell Telephone Company of Canada at Montreal, going from there to the Bell Telephone Company at Buffalo. At Buffalo he was for twelve years engaged as engineer and as manager of branch exchanges and toll lines. When the Rochester Telephone Company (Independent) was organized in the spring of 1899 promoters of that enterprise cast about for the best qualified man they could find for the management of that company. Their selection was Mr. Stinson, who resigned from the Bell company of Buffalo, May 18, 1899, and accepted the position of superintendent for the Rochester Home Company. Six months later, upon completion of the construction of the Rochester system, he was made general manager of the company. The history of the Rochester Home Telephone Company is the best tribute that could be paid to the genius and energy of C. E. Stinson. It is doubtful if any telephone company has a better record, not only as to character of construction and service, but as a financial success. Mr. Stinson not only made the success of the Rochester plant, but he did more, probably, than any other man to develop the Independent telephone business in western and central New York.

The Memphis Telephone Company (Independent), Memphis, Tenn., opened its exchange in the summer of 1902, and its growth was so rapid that its president, Hon. Harvey Myers, found that its business required more of his time and attention than could be spared from his law practice at Cincinnati and his home at Covington, Ky. As the company had in contemplation the building of an extensive toll system, with Memphis as its center, the necessity for a thoroughly equipped telephone man became greater, and the entire country was looked over for the best man available. Negotiations were opened with Mr. Stinson, with the result that he acquired a large interest in the company, and on February 1 became its president. With characteristic energy he has devoted himself to the company's development, locally and in the long-distance field.

LINE CONSTRUCTION.

No definite rule can be given for the depth at which poles should be set in the ground. The character of the soil, the distance between poles, the number of wires carried, and the sharpness of the turns made in the line must all be considered in determining this question. For average work we would point out the following table, which we believe to be in accordance with the best practice:

25 foot pole, 5½ feet in the ground.
30 foot pole 6 feet in the ground.
35 foot pole 6 feet in the ground.
40 foot pole 6 feet in the ground.
45 foot pole 6½ feet in the ground.
50 foot pole 6½ feet in the ground.
55 foot pole 6½ feet in the ground.
60 foot pole 7 feet in the ground.
65 foot pole 7 feet in the ground.
70 foot pole 7½ feet in the ground.

Where the ground is bad, or where the conditions are very severe, the holes should be larger than usual, and about six inches of concrete, composed of broken stone, sand and enough cement to bind them together, should be placed in the bottom. The pole should then be put in place and the hole filled in with the same mixture, which should be thoroughly tamped into place.

It sometimes happens that a pole cannot be set deep enough into the ground on account of some sewer, subway, or other obstruction. In such cases the hole should be dug as deep as possible, and considerably larger than would ordinarily be necessary. The pole should then be set in place and its end thoroughly embedded in a mass of stone and cement entirely filling the hole. If the strain is at all severe, the pole should be thoroughly guyed in addition to the above precaution.

Great mistakes are often made in laying out pole lines by introducing unnecessary turns in the line. It should be remembered that where a line is straight the tendency of the wires when properly strung is simply to press the poles deeper into the ground. But where a bend occurs in the line an enormous side strain is present which tends to either break or loosen the pole. The magnitude of these strains can only be appreciated by those who have had actual experience in the work.

In running a line over undulating country it should be borne in mind that the holes in a hollow of the ground should be long and those on elevated positions comparatively short, the object being to avoid very great upward and downward curves in the wire.

Where this precaution is neglected it is frequently found that the insulators are pulled off the pins and dangle several feet above the cross-arms, and frequently a short pole in a low position is pulled entirely out of the ground.

The butt of the pole should always be squared before setting.

Mr. Frank Treman Wyckoff, president of the Wyckoff Pipe and Creosoting Company, Portsmouth, Va., died at his home, "Spaffath," Strawberry Hill, Stamford, Conn., of Bright's disease, on February 19.

Telephony.

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THE REAL TELEPHONE TRADE JOURNAL.

Whenever a business develops a sufficiently broad and general character, it finds for itself a spokesman or mouthpiece in a trade journal devoted to the exclusive interest of the particular business which the publication represents. The function of such a publication should be to serve the best interests of the trade it represents. But who shall say what the best interests of the trade really are? There is no brain so pre-eminently the superior of all the rest that it can dictate a policy on all disputed points. The infallible editor has not yet been created.

The wise publisher of a trade journal early learns the lesson that his mission is not to lead his subscribers into new and unexplored countries, but, rather, it is to follow in their footsteps, taking notes of the happenings by the way. The editorial Moses is invariably an editorial failure. In the first place, his chosen people do not care to be led out of the land of Egypt; and, in the second place, it is not his business to lead them if they did.

A trade journal is good just so far as it represents its trade. It is bad and weak just to the extent that it represents the individual ideas or fads of its publisher or editor, in conflict with the trade it assumes to represent. Such a publication can be no better than its trade will support, and if it is not up to the standard, its fate is sealed. Without trade support, a trade journal cannot live. The measure of a publication's success, therefore, is a measure of its popularity and adaptation in its chosen field. Presumption on the part of a trade journal editor, to dictate or control in the particular trade covered by his product, is the forerunner of the inevitable failure of his journal.

A good publication is a trustworthy servant of the interests it represents, tactful, earnest, honest and untiring in endeavors to do its work faithfully and well. In it there is no room for personal ambition, no opportunity for personal vengeance. It is responsible to one master, the reader of its columns. That one it must obey.

In no field of journalism is this so true, as in the telephone trade publications. The true telephone exponent must be wide-awake and pushing as the business it represents. It must be independent in thought as well as deed. It must be honest with its readers and itself. Above all, it must be broadly representative of the diversified interests whose servant it is.

It is conceded by all practical men in the telephone business that the successful telephone journal of to-day and the immediate future must be a monthly and not a weekly. The endeavor to publish telephone weeklies has invariably failed of support. The reason of this is obvious. A weekly publication in the telephone field is an importunate beggar for valuable time. It knocks at the door of progress and interrupts business with its hastily collected conglomeration of inaccuracies and misinformation. When an important event transpires, it is unable, either from lack of space or lack of time, to present the subject as it should be treated. When, on the contrary, news or views are scarce, it must, perforce, resort to padding out its shrunken form with a variety of mental food that fills but does not satisfy.

There can be no literature in a weekly telephone journal; its place is ordinarily taken by a dry summary of uninteresting items alleged, upon the editor's unsupported word, to be facts worthy of credence by the reader. Not infrequently, vague prognostications of things yet to come are solmenly set forth by the presiding genius, who in an endeavor to take himself seriously, enacts the tragedy of vanity dethroned.

The larger part of a weekly's pages must be filled with matter gathered from unreliable news-clipping bureaus and pasted together in a phantasmagoria of patch-work paragraphs of interest to no one in the world. Thus, too often

are the editorial scissors made to take the place of brains. How insignificant does a weekly appear beside the compact, attractive monthly, its pages fairly weighted down with the best thought and power of the trade. The appearance of the monthly, with its well-filled advertising columns, its half-hundred or more pages of reading matter, and the profuseness of its illustrations, is ample evidence that to it are granted the confidence and support of the trade, which are denied to its would-be rival, the weekly.

The monthly telephone publication, representative of the art of telephony, bears the earmarks of success. It represents a successful business, and must, itself, succeed. It rises superior to petty jealousy, and disregards the snapping and barking of envy at its heels. Its subscription list and its roll of advertisers, alike, denote that it is filling its place in the trade. It is substantial, business-like and impressive. It stands for a business of which any man may well be proud.

In its pages, important matters are treated fully and exhaustively; it prints no mere summary of news clippings, but is filled with articles of practical worth to every telephone man. It does not intrude itself so often as to become cheap or meaningless; its subscribers look forward to its coming. It is not tossed into the waste basket or left unopened on the desk, as is all too often the weekly's fate. It is read from front to back and then is filed away and kept for reference. It is the standard for all time to come.

Besides the important element of being a monthly, the successful telephone paper must be in close touch with its trade. The center of that trade is the great middle west, and there must the successful journal have its home. A Cleveland, St. Louis, or, above all, a Chicago address must be at the top of the editorial page. A paper published five hundred or a thousand miles away from the business it caters to is a stranger, and sees things with a stranger's eyes. It has no sympathy with its field, but lives a life apart. It is viewed askance by the men whose confidence and trust it must secure if it would succeed.

The publication whose home is in the center of its chosen field, around whose office, the business life of which it is a part, seethes and rushes on, catches the spirit and feelings, and is in sympathy with its trade. It sparkles in the sunlight of prosperity, and is shrouded in the gloom and shadow of hard times. Its readers reach out to it their hands and greet it as a friend.

Upon no class of men do there rest greater responsibilities than on the editors. Their product is periodically born of hard work and constant striving. Each issue is an epoch in itself. Editors may come and go, their ships may be carried on the high tide of success, or adversity's waves may overwhelm their heads, but the publication, if it have within itself the right to live, will go on and on and on to the accomplishment of its fixed purpose, and to the upbuilding and strengthening of Independent telephony. Its measure of success will be the growth of the business itself.

It is an old axiom that "Silence is the first resort of the wise and the last resort of the foolish."

WHY INDEPENDENTS SUCCEED.

It is not very difficult to find a reason for the unprecedented success of the Independent telephone movement during the past ten years; its splendid advance has been due to a number of causes, not the least of them being the loyal support of the entire people of the United States, who have tired of the extortionate charges and poor service of the sublicensees of the American Bell Telephone Company. This erstwhile monopoly was under the erroneous impression it could fool all the people all the time and keep in undisputed possession of the telephone field, even after all the basic patents had expired; it had grown rich and lazy; puffed with its own importance, it levied usurious tribute with no regard for the people's rights; it gave indifferent service and charged the most unreasonable prices, and the people were expected to meekly submit. In this the Bell company overstepped itself. The people rebelled and threw off the Bell yoke. The Independent telephone movement was the result. Giving good service, charging reasonable rates, building exchanges in the hamlets and villages, as well as in the towns and cities, the Independents prospered; they had not tried to fool the people; they offered telephone service at a price within the reach of the artisan and laborer; they connected the farmer with his neighbor, and both of them with the surrounding towns and villages; they did not have to pay excessive royalties or earn dividends on watered stock, but were satisfied with a fair return on the actual investment; they acted fairly and earned the confidence of the people, gave good service at moderate rates and brought the telephone to its present sphere of usefulness. These are but a few of the reasons why Independents succeed.

With apology to a well-known manufacturer of baby food, "We are advertised by our loving friends."

THE LAW OF TELEPHONE CORPORATIONS.

In response to numerous requests we submit to our readers a preliminary idea of the law or corporations as the same has reference to the organization and conduct of telephone exchanges.

The property of telephone exchanges may be owned and the business thereof be conducted either by an individual, a co-partnership or a corporation. Now, corporations for this purpose may be organized by several different modes of procedure. First, there is what we may term the close corporation—i. e., a stock company wherein the money necessary to equip and conduct the exchange is furnished by a comparatively few persons, who become the owners of the capital stock, and conduct the business in their own interests, risking the loss of their investments, if there be a loss, and so rightfully being entitled to the dividends in case the venture prove a paying one. Under such an arrangement the users of the telephones have no interest in the company farther than to see to it that it carries out its contracts with them.

Secondly, the corporation may be what is known as a mutual company; here each subscriber to the exchange becomes also a stockholder in the corporation and the dividends are received pro rata by them. Each user of a telephone under this plan sustains a dual relation to the company—viz., that of subscriber to the capital stock and of a user of the telephone under contract.

Thirdly, there is the purely co-operative plan of incorporation; here each user of a telephone is a sort of partner in the enterprise and is entitled to a proportionate share of the net profits; but, on the other hand, becomes personally liable for the debts if loss occur.

In general it must be borne in mind that each state makes its own laws relative to corporations; there is no general law applicable to the citizens of all states, but it is believed that the above embraces the general outline of corporate law applicable to enterprises of the nature under discussion. In the end we find that the rights of all persons in this regard are based upon a contract, and the various methods of incorporation indicated herein are in effect only different forms of contract. For instance and to sum up, in the two corporations first mentioned there is a limited participation in the profits, accompanied by a correspondingly limited liability on the part of the person interested in the company; in the third a larger interest in the profits, to which is added a greater liability in case of loss. Without the facts of particular cases in a particular state, it is quite impossible to go farther into details, except at the expense of accuracy, so

it is intended that the foregoing shall serve only as "hints," leaving the details to be worked out upon lines suggested when any of our readers see fit to apply to us, giving the facts of the case in full.

Omega oil philosophy admonishes us to "use the top of our head more and our tongue less."

WONDERS OF TELEPHONY FROM A LAYMAN'S STANDPOINT.

Electrical engineering, as applied to the innumerable improvements in the construction of telephone instruments, is accomplishing new triumphs daily. The rapidity with which the distance over which telephonic communication can be had exceeds the most vivid imagination. It is only a comparatively short time since people were incredulous when they were told of the likelihood of Chicago and New York being able to converse with one another. Now we are perfectly willing to accept any statement that telephone engineers choose to make with respect to their ability to accomplish anything in this department of science.

The mystery of it all is a cause of never-ceasing wonder. One can arise from the place where he is writing and call from his desk a friend in Chicago. When one speaks the impulse of his voice goes out through a gimlet hole in the wall, it speeds away over the housetops, through the smoke and noise of roaring shops and factories, or across fields and rivers and prairies and lakes and mountains, through towns and villages. It passes through forests, where birds are singing; it passes the farmer's wagon toiling along the country road; it goes past school houses, where children are droning over their books. It perhaps encounters a thunderstorm, but on it goes through every sort of sight and scene, over the roofs and through the roar of large cities, straight from our vocal chords to the tympanum of the receiver at the other end, which little bit of metal transposes the vibrations into articulate speech, and it in turn tells to his friend the thoughts that he is uttering. It not only does this, but it does it so faithfully that one is able to recognize the tones of the other's voice and would probably be able to discover the identity without the necessity of announcing it.

The performance of this little tympanum in the receiver is one of the most curious of the many curious things about it. We had commonly supposed that in order to produce articulate speech certain motions of the mouth, which could not be imitated, were necessary, but here is a little flat piece of metal that actually talks, and talks plainly too. The vibrations of the vocal cords, modified by the mouth, teeth, tongue, and lips, for we use them all in talking, has set up similar vibrations in the transmitter, and these vibrations, unseen and unfelt, have, somehow or other, by the aid of electricity, traveled a great distance. Imperceptible and weak as they are, they have in all their long journey lost not one whit of their quality, tone or accurancy. Every infinitesimal inflection has been retained, and, all in their proper order, they strike the diaphragm of the receiver and the receiver talks.

It gets there, but how? Does it drive straight through the hundreds of miles of copper wire which stretch out between the two cities, or does it travel on the surface of the wire? Ask the telephone expert and he will tell you he does not know. It is certain, however, that the wire has something to do with it in the present state of the art. But it may be done without a wire. In an experimental way telephone messages have been sent by the aid of a ray of light. It has carried the vibrations of sound and reproduced them in the same way as is done by the aid of a wire and the electric current.

Reflection upon the subject leads us to doubt whether there is really any such thing as distance. Maybe our friend could hear our ordinary conversation at so great a distance without any instrument if he had the right kind of an ear. It has been recently demonstrated that telegraphing can be carried on through long distances without any wires, provided the proper instruments are at hand to catch the vibrations and make them perceptible to the human ear. It has been discovered that there are invisible rays of light which penetrate what we call opaque substances and that there are sounds which the human ear is incapable of apprehending. All sound and light is caused by vibrations, and only those within a certain compass produce any effect upon our organs of sight and hearing.

We are just beginning to understand how little we know about these matters, and, having arrived at that state, are beginning to find out more. If a beam of light can so arrange the medium for the conveyance of sound that the vibrations which produce it will follow its direction and be reproduced, is there any limit to the range of sound? May we not one of these days hear the roar of the conflagration on the sun, may our ears not catch the sounds on Mars and on the other planets and stars, and may we not converse with their inhabiatnts if they have any? None of these are much more wonderful than the performances of the little talking disk which repeats our conversation to our friends so far away.

SECURING RIGHTS OF WAY.

In the way of practical matters we append herewith some suggestions regarding the method and importance of securing right of way, to be made use of by telephone companies covering important points in the building of toll lines.

It is not simply the distribution and erection of poles and their arms and brackets, the stringing of wires and installation of the telephone that constitutes the beginning and end of building a telephone toll line; it is primarily the securing of a right of way.

Now this may, and indeed if possible should be, done by amicable agreement, but if the owner of the land which it is intended to cross is arbitrary and no compromise be possible, proceedings in court, known as condemnation proceedings, must of necessity be resorted to. Application is made to a court of record to appoint commissioners, whose duty it is, under the law, to assess the damages to the land of the owner which is proposed to be occupied in whole or in part by the telephone company for its use as a right of way.

After an investigation by these commissioners they fix the amount of the damages to the land as aforesaid and report the same to the court. If such report be not satisfactory to either party a jury may be called by the court to assess the damages, and upon the finding of this jury or the report of such commissioners, as the case may be, the court will enter a judgment, and unless appealed from the same will be binding upon all parties to the proceeding, and upon payment of the amount therein found as damages the company will have the right to proceed with the erection of the poles, stringing of wires, etc., necessary to the proper carrying out of its proposed enterprise.

Where the owner of the land proposed to be taken is unknown or cannot be found, service may be had upon him by advertisement in some newspaper in the county in which the land is situated. As a general rule, telephone companies should have in their employ regularly right of way men. Of course, in cases where resort to the courts becomes necessary matters should be turned over to the company's legal counsel.

No construction should be attempted until a clear and complete right of way has been secured, as dissatisfied parties could give serious trouble and annoyance even after a line was in full operation, going so far as to entirely stop service inasmuch as its passing over their ungranted rights were concerned.

The above may be of some service to those who have not investigated the subject and who desire to build toll lines. TELEPHONY, on request, will be pleased at all times to give data or information on this or any other matter of interest to persons contemplating the erection of or engaged in the maintenance of telephone exchanges and toll lines, or to the employes and assistants of such persons.

"God made man with one tongue and two ears, that he might hear twice as much as he says."

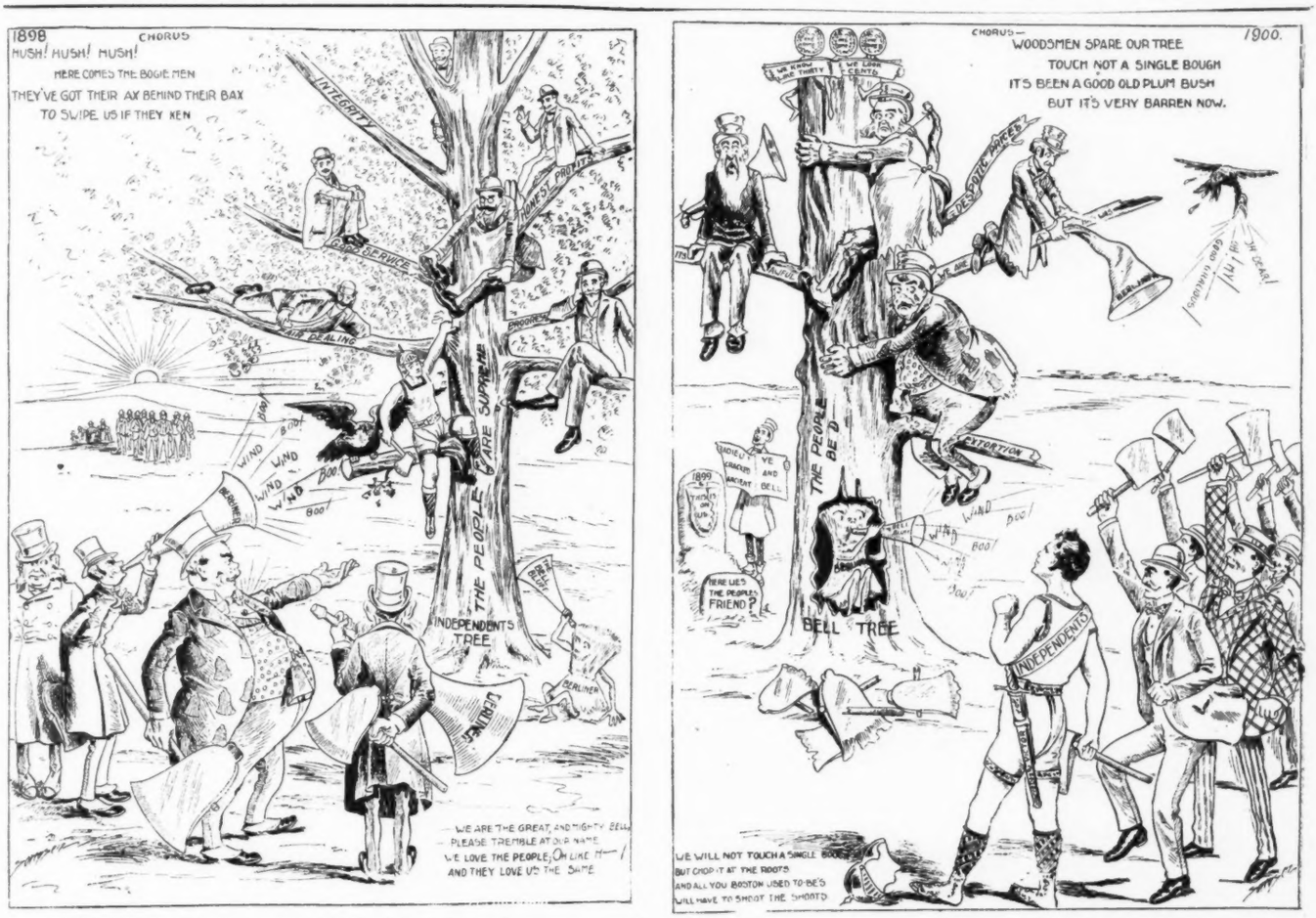
POSSIBILITY OF THE TELEPHONE.

The greatest progression in the history of the telephone has been marked by the closing of the year 1902. There has been a remarkable increase in the number of telephones installed, while possibly there has been a slight decrease in companies established, due to the fact that the larger cities are now being more thoroughly invaded and the larger corporations are bringing into the fold the smaller exchanges, thereby giving the subscriber of the latter more efficient and quicker service and at the same time placing both parties in close touch with each other and at a reasonable rate.

Independent telephony to-day is giving the highest class of service. The reason for this is apparent. The movement has been built up to its present magnitude by men who have devoted years to its study. Continually on the lookout for improved apparatus and profiting by experience, they have, step by step, brought Independent telephony to its present state.

Many can doubtless remember when a few business men would get together and organize a small company for the purpose of establishing telephonic communication amongst themselves. It is from just such little saplings as this that has grown the mammoth tree of telephony whose branches to-day are reaching in every direction.

To the uninitiated it is surprising to note the different classes of people to whom the telephone is indispensable. To-day there are installed complete systems in our large office buildings; among the trales people, such as grocers, etc., the telephone is one of their chief reliances. The doctor is in communication day and night with his patients, and sudden sickness has lost a great many of its terrors to people who may be living away from otherwise quick communication. The manufacturer has a customer, possibly miles away, for whom he is doing work; exigencies arise that call for quick communication. He cannot leave his factory to go and call upon the customer, neither can the customer come to him; it would entail the loss of too much time. But he can call him up by telephone—and the work proceeds without delay.



The above cartoons were published in 1899 and are now particularly pertinent on account of the recent Berliner decision. The condition of the Bell company has not improved since these cartoons first appeared.

I have every copy of TELEPHONY, from number one to the last number, and it grows more interesting all the time.—FRED COULSON, O'Hama, Kan.

The police stations of Chicago no longer have fire telephones. It is claimed that the abuse of privileges by the police department has caused the withdrawal of the instruments. It is charged that policemen not only dropped in slugs themselves, but distributed them among their friends.

QUESTIONS AND ANSWERS

Conducted by J. C. KELSEY, Professor of Telephony, Purdue University.

I have a full metallic line in operation, three miles long, with twelve one thousand ohm bells, bridged as shown in Fig. 1. I propose to connect several grounded branches to it, as per dotted lines in Fig. 1. Will this give satisfaction?—J. H. P.

It will possibly give satisfaction, if local conditions are favorable. The sensitiveness of a line depends a great deal on the liability of induction. If there is a great amount of paralleling disturbing circuits, then any kind of a ground on the line will prove noisy. But if the line is short and free from induction, and an equal number of bells on each side, it looks as if the balance of the line is not seriously disturbed by the addition of three grounded bells on each side of the line. This method of running each bell to earth and use each side of the line for split ringing has been in successful use for years. But a condition arises in the usage

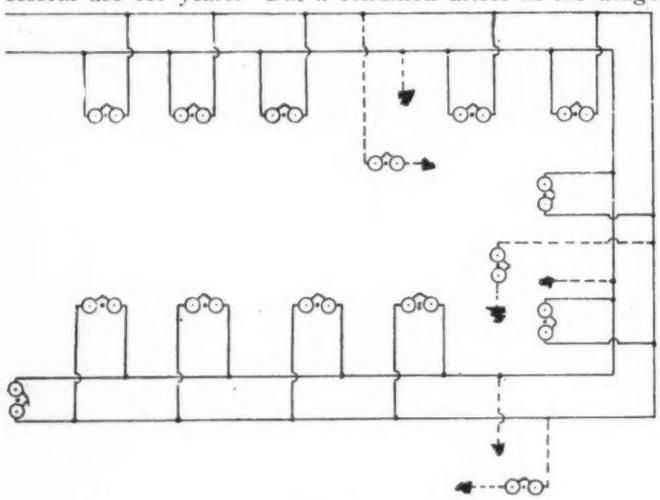


FIG. 1.

according to Fig. 1. As long as the 1,000-ohm bell connected the line to earth there would not be a great likelihood of unbalance, but when the telephone is off the hook there would be an equivalent of a dead ground, and the chances are that the line would be noisy under the best of conditions, as regards induction and length of line. Judging from the location, Pennsylvania, it is to be doubted that the method described would be successful, owing to the great number of electrical industries in the state, which would result in some earth currents, and the presence of these on the metallic line would make the service poor. It is all a case of local conditions, for what operates successfully in Pawtucket will not necessarily operate successfully in other parts of the country, as many telephone engineers will admit.

We have one hundred and fifty telephones in the Lexington exchange, with a part of the lines connected to the common return, and the other part grounded. Our return is No. 12 iron, of a very cheap grade and has not been put up as it ought to be. What kind of wire should we use and how should it be put up to get the best results? I have two routes coming into the office, and should the two returns be connected at the junction pole or should they be run to the board?—G. T. M.

No. 12 copper wire will make the right kind of a return, and should be put up on glass carefully and all connections soldered to it. The two returns should enter the office and terminate in switches, so that the lines could be easily separated and the trouble found without interfering with the subscribers on the return. The returns should be well grounded at the exchange as long as you have grounded service. The return must be free from ground, except at the office, to avoid noise due to earth leakage. When the old Galveston exchange of 900 lines, common return, was rebuilt it was discovered that the main return had been accidentally sawed in two, and for years no one was the wiser. With 150 lines the chances are that it would be noticed, because 150 lines would not make as good a return as 900 lines. Yet one can easily imagine that the reason for the non-discovery of the cutting of the return was that conditions in the first place were so bad that they could not be worse.

In my telephone work I have used some original ideas, which have proven very satisfactory. Although I think they should be patented, I prefer to give them to the cause of Independent telephony. The efficiency of any telephone receiver can be increased one-fifth by using the magnet therein as one of the conductors. One end of the bobbin coil is soldered to the steel, and one terminal of the receiver cord is also soldered to the magnet at places, which will make the current traverse the greatest length of steel. As the strength of the receiver depends solely upon the number of magnetic lines of force the bobbin current cuts, it will be seen that this arrangement cuts many new lines of force without adding resistance. I have also a simple device for party lines, which will tell instantly the party listening, which is a small tube attached by leverage to the hook. A small drop of mercury rolls over pins connected to the battery spring. By varying the number of pins I can tell which receiver hook is lifted. This reduces rubbering to a minimum.—E. B. C.

This department leaves these ideas for the reader to think about. It would hardly prove advantageous to know who is breaking in, and it would be more effective to prevent any one breaking in at all while any telephone is in use.

I would be pleased to have a full definition of selective ringing systems, a full information covering the same; also full definition and information regarding transposing circuits, say, one fifty miles long. Would it be necessary to transpose it or is it only done where two or more circuits run parallel to each other? How are circuits transposed? Would like to see a sketch of an illustration showing insulators, wires, etc., being crossed. How many 'phones can be used on a selective signaling circuit?—M. J. E.

There are several large Independent manufacturers who have distinctive types of selective ringing, and it is perhaps better that we refer you to them for fuller information regarding their systems. The American Electric Telephone Company has a four-party system, using two alternating generators of different frequencies, twenty and sixty cycles, and can ring four parties very nicely. The Kellogg Switchboard & Supply Company has a four-party selective system for harmonic ringing—that is, with four generators having four distinct frequencies, which ring four parties very decidedly, and do not use the ground at all. The Sterling Electric Company also has a four-party system which uses a biased bell—that is, one which will respond only to a pulsating current of a certain polarity. This requires a generator giving out plus and minus direction pulsating currents, and is not at all difficult to handle. Other manufacturing companies possibly have such systems of which we are not familiar. The companies will be pleased to inform you fully concerning the respective merits of their systems. A selective signaling system permits certain subscribers on a line being rung up without ringing the bells of the other subscriber's sets. The system may be two or four or eight party, and there is no great reason why sixteen parties may not be successfully selected.

It is a good plan to transpose a line fifty miles long, whether or not a single circuit. There is a likelihood of

others being built, and transpositions cut in regularly every two miles would not come amiss. For illustration we refer you to "Toll Line Specifications," by W. H. Crumb. In this little pamphlet there is information that every prospective builder should have. A copy may be secured from TELEPHONY.

We have a very common trouble, but one that seriously affects all alike, and one that should be understood perfectly, for it seems in this locality that telephone men differ greatly in regard to it, viz.: Can a metallic and grounded line that parallel for fifteen miles be so constructed that they will not cross talk? Is this not a very common ailment among the Independents?—W. B. S.

It should not be a hard matter to make the above conditions cross-talk proof. If the metallic line is well insulated—that is, free from any kind of a leak to earth—there should be no cross-talk from earth current or leakage. The next possibility is that the metallic line is not transposed so as to avoid induction between the two lines of dissimilar nature. If two untransposed metallic lines will cross-talk, there is more reason to think that an untransposed metallic line and a grounded one will cross-talk. And there is such a thing as the transpositions being cut in wrong, too. A metallic line that is not properly transposed is no better off than one that is not transposed at all. If the metallic line in the above case is proportionately transposed and is free from leakage, then the cross-talk tendency will not be apparent at all. In answer to your second question, we are prone to believe the trouble is *very* common.

In TELEPHONY of January, 1903, you published a question which I gave you, and also an answer to the same. I found shortly after giving you the question that the trouble was caused by one side of the metallic circuit tapping on a ground wire. This repeatedly unbalanced the circuit, and at the same time allowed the static charges, caused by the high winds, to flow to the ground. The charge would divide at a point approximately opposite to the place where the ground was located, and would flow in opposite directions, uniting and discharging to ground each time the line touched the ground wire, thus passing through the bridged bells, causing them to tap each time the line touched the ground.—C. E. R.

To the readers who have overlooked the above question it will be explained that C. E. R.'s line became noisy when high winds existed. It caused a falling of drops and an unceasing tapping of bells, and the reason we gave was that dust particles or wheat chaff or snow being driven across the metallic circuit would cause unequal conditions of static charge, thereby causing a surging of currents through the circuits, which necessarily would throw down drops and tap the bells. The reason given above shows trouble from conditions other than normal.

Is it necessary to have fuses on a line that is not near to a trolley line, or any heavy current wires, and are the fuses any protection from lightning, or do carbon arrestors afford the protection?—J. H. P.

It is not absolutely necessary to have fuses on such a line. Fuses certainly are protection from lightning, for after any heavy storm great numbers of fuses are found to have been blown. A great many managers object to the use of ground and arresters at the subscriber's station—that is, that class of subscribers not having grounds at the instrument on account of selective ringing. The protection, while it results in blown out fuses and interrupted service, undoubtedly has many points in its favor. If there was no ground at the instrument the chances are that the lightning would not have disturbed the instrument end of the line at all. Yet that is doubtful, for if lightning finds the line something is sure to go. It is only the counter charge of lightning usually felt on telephone lines which is comparatively harmless, but not harmless enough to disregard entirely. The action of lightning follows no fixed rule. Sometimes arresters are burned up entirely and the instrument is not harmed; on the same line an arrester is undisturbed and the instrument is entirely destroyed. It is generally a local condition, for lightning seems to have different effects in different localities.

Will you please explain how the bells in selective ringing are made to respond to certain currents?—J. N. R.

Take first the plain alternating current bell, as shown in Fig. 2. Two soft iron cores, C and C¹, are bolted to the

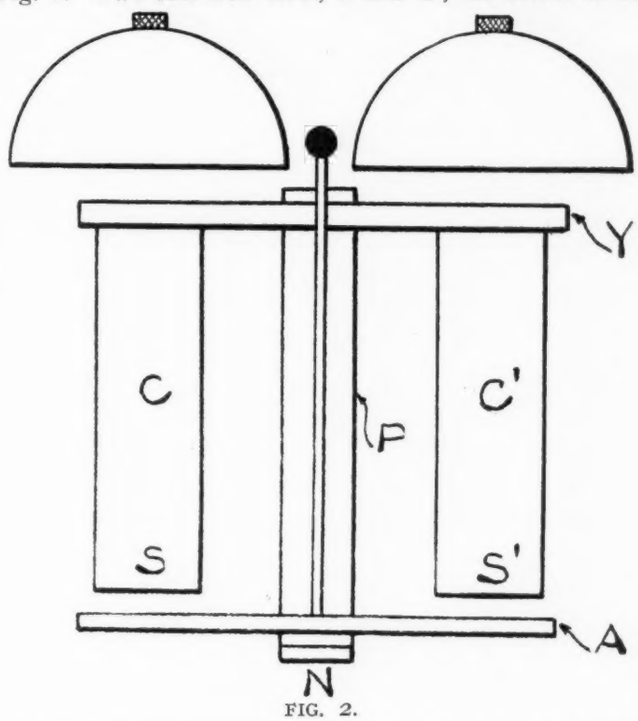


FIG. 2.

yoke Y. The permanent magnet P, Fig. 3, is attached to the center of the yoke and serves to magnetize the cores, making the lower ends both south. As the lower end of the

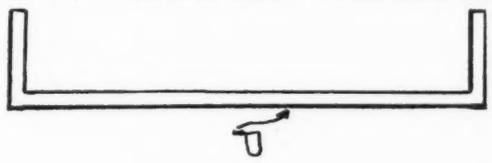


FIG. 3.

permanent magnet P has north polarity, there will be a complete magnetic circuit formed. The soft iron armature A, pivoted just below the cores, will be attracted to both

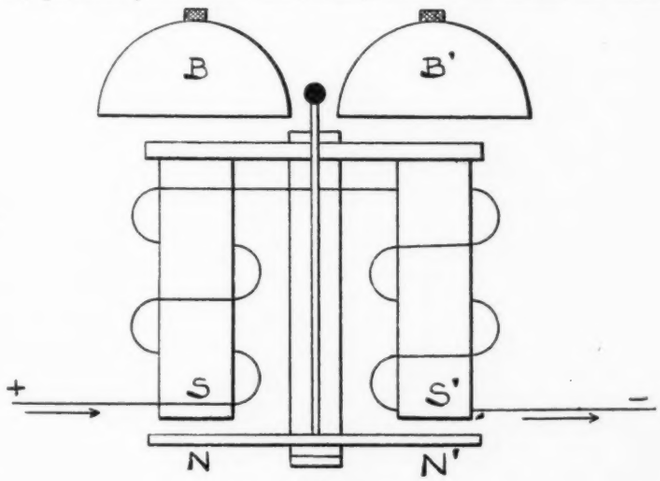


FIG. 4.

poles S and S¹ with the same strength. Now consider an alternating current flowing through the coils, and for

clearness take first a positive impulse flowing as in Fig. 4. Applying the "right-hand rule," it is seen that lines of force will be set up in the cores of such a direction as to make the left-hand pole south, thus reinforcing its original magnetism. This will produce a north pole on the right-hand core, but as the original polarity there was south, the two will act to annul each other, leaving no free magnetism. It will be observed that there is now a stronger force attracting the end of the armature marked N, while the end marked N^1 is no longer attracted. The armature will therefore move and cause the tapper to strike the bell B^1. An impulse in the

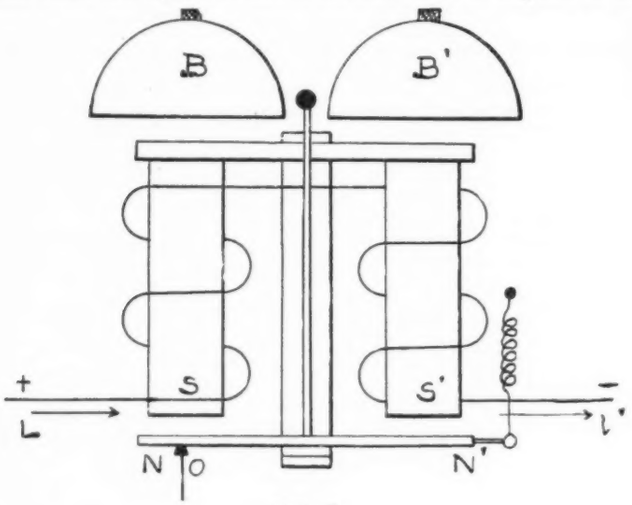


FIG. 5.

other direction will cause exactly the opposite effect. S^1 will be reinforced and S will be weakened, causing the tapper to strike the bell B. In this way an alternating current will cause the bell to ring continuously. In Fig. 5 a bell is arranged for a positive pulsating current. As the current rises to a maximum N will be attracted, and as it falls to zero the spring returns the armature to the normal position. If a negative pulsating current be sent through the coils, N^1 will be attracted, but to no purpose, as the armature is prevented from moving by the stop at O. All that is required to make this bell respond to negative pulsating currents is to interchange the connections L and L^1. An alternating current will ring both of the pulsating bells, as it will have impulses of both a positive and negative character.

PROGRESS IN SOUTH EASTERN KANSAS.

BY M. L. ROBESON, GALENA, KANSAS.

Independent telephony was first started in Southeastern Kansas as early as 1887 at Girard, but as this exchange was operated only about two years, this can hardly be called the birth of the Independent movement in this section. In 1896, however, Mr. Crawford, who is still the operator of this plant, again opened his exchange for business and commenced operating with about seventy-five telephones. In September, 1895, the Galena Telephone Company opened its plant at Galena with seventy-five subscribers, and in February of the next year the Chetopa exchange was started with about the same number, making two hundred and twenty-five instruments in all, which, I think, was the entire number of Independent telephones in operation in the Southeast corner of the state. But the movement was started and exchanges began to be built everywhere, until now there is not a town of two hundred inhabitants or over that has not an Independent system, except Pittsburg. Here, in 1896, a company was formed and construction started, but before the work was complete the company had spent all its money and the unfinished plant was sold to the Bell company. Nothing was done then for three or four years when another company was organized and work was commenced on a second exchange. This time the exchange was completed and gave its patrons a satisfactory service for a little less than two years, when the Independents again sold to the Bell.

Pittsburg was not long to be without an Independent telephone service, however, as a third company was organized and was granted a franchise within two months after the second company was sold. The present company has bought a lot on which it will erect its own building, and as soon as the material arrives will commence the construction of a splendid central energy system with its wires underground in the business districts. This company has come to stay. They expect to open with seven hundred subscribers, which will make nearly three thousand Independent telephones, against two hundred and twenty-five six years ago, in operation in this district, that are connected by four hundred miles of metallic circuit toll lines.

There is still room for a very large increase in number of stations in most of the larger towns and the farmer lines have barely commenced to build, which means that, in this territory, the number of telephones will be increased to four thousand five hundred in the next few years.

Most of the exchanges connected with this toll system are fairly well constructed, using the McClure or common return system, although the larger ones are contemplating the change to complete metallic circuits. All of these exchanges are giving a very satisfactory service, with the exception, perhaps, of one or two, and I do not know of one that is not paying a very fair interest on the investment.

In order to take care of the new business which is bound to come, it will only be necessary for these companies to put up more cables and make the circuits metallic, as the pole lines can, with little expense, be put in proper shape to carry them. Of course the outlay required to supply the farmers with telephones will be greater, but many of the circuits to supply this class of business can be strung on the existing toll line poles.

With their energies directed to the building of exchanges for the first few years, the Independents did not realize the importance of connecting toll lines, and it was not until 1898 that they began constructing such lines. Now, there are between four and five hundred miles of good metallic circuit toll lines, connecting all of the larger towns and reaching nearly every post office in the territory covered, with a toll station. In addition, these lines reach into Missouri and the Indian Territory, supplying the entire lead and zinc district of Missouri and Kansas and many towns in the Territory with Independent toll service.

These lines are built with five and six-inch top twenty-five foot white cedar poles carrying metallic circuits of number ten and number twelve extra B. B. iron wire. Of course the circuits now in use would not do for strictly long distance work, but for the work for which they were designed, that of connecting the towns in this immediate territory, they give a very reliable and satisfactory service.

All of these pole lines are sufficiently well built to carry additional circuits, and a number of the companies are now planning to string circuits of copper quite extensively to enable them to connect with other toll systems on all sides; points in the Territory and Oklahoma on the south and west; points in central Missouri on the east, and central Kansas on the north.

The only thing of importance now lacking to promote the rapid expansion and general good of the Independent movement in the natural gas, lead and zinc and coal mining districts is thorough first-class long distance lines to Kansas City and St. Louis. Such lines, I am informed, are soon to be built, the completion of which we await with great interest.

"Teach thy tongue to say, 'I do not know.'"

Iowa Independent Telephone Convention.

The Iowa State Telephone Association held its seventh annual meeting at the Savery Hotel, Des Moines, Iowa, on March 10 and 11, 1903. The convention was called to order by U. S. Alderman, president, who, before reading his annual address, appointed the following committee on credentials: George N. Bandy, Charles C. Deering and Charles R. Kirk, who reported that nearly one hundred had paid their dues and were in good standing. The treasurer's report was then read, showing the association to be in sound financial condition. The total receipts for the year, with balance brought over from last year, amounted to $606.51 with expenditures for the year of $223.65, leaving a balance in the treasury of $382.86. The committee on rates appointed last year, composed of Messrs. Herr, Bandy and Odebout, made no report. In his annual address, which was then read, the president said that the association had passed through a good year and spoke at some length upon the aims and objects of the association, laying particular stress upon the advantages to be derived from the exchange of ideas and the mutual protection afforded men associated together for a common purpose. He spoke on the ills of nefarious legislation, and advised members to interest their neighbors in the association for the many benefits to be derived for all. He touched on the need for harmony and spoke of the now defunct Berliner patent. In closing he touched on the great amount of Independent work going on all over the country, and laid particular stress on the activity in the state of Iowa.

Following the president's address B. J. Carney read a paper on "Cedar Poles," which was followed by the reading of a new set of arbitration rules prepared by U. S. Alderman. After being referred to a special committee they were reported back to the association and adopted without change, as follows:

ARBITRATION RULES.

First—The president shall appoint, subject to approval by the executive committee, a committee of three on arbitration, whose duties shall be to hear and decide cases of disagreement submitted to them, if within the jurisdiction of the committee as hereinafter defined and in which the question in dispute refers to the telephone business or matters pertaining thereto, and does not involve any question of the policy of this association.

Second—Such committee shall have authority to hear and decide all questions referred to it properly under its jurisdiction, and its decision when made shall be final except the right of appeal to this association when next in convention assembled.

Third—Any member of this association who shall feel aggrieved by the act of another member or by the act of a person outside of the association, or any person not a member of this association who shall feel aggrieved by the act of a member and desires the case to be arbitrated by the committee, may state his grievances in substance in writing to the secretary, with his request for arbitration of it, also stating whether or not there is pending any action in court on the questions to be submitted.

Fourth—When the secretary receives the statement in writing of such grievance and he considers it a proper case to refer to the committee on arbitration, and no action has been begun thereon in court, he shall within ten days notify the opposite party to the case, who shall within ten days thereafter advise the secretary in writing whether or not he is willing to submit the case to the committee on arbitration for its decision, and if in the affirmative he shall at the same time furnish the secretary in writing a statement of the facts in the case so far as he knows them. The secretary shall then notify the applicant of said acceptance, who shall within three days thereafter furnish the secretary in writing with the material facts in the case so far as he knows them. Each party to the case shall verify under oath all evidence he submits in writing, and each party to the case before it is submitted to the committee shall agree in writing to submit the case to the committee on arbitration; that no action is pending thereon in court; that he will abide by its decision except only the right of appeal to the association, while in convention assembled; that he will release all members of the committee from any responsibility for errors in judgment in any respect whatsoever, or for any damage or any loss suffered by reason of their acts, and will further deposit with the secretary the sum of five dollars ($5.00) if a member and ten dollars ($10.00) if not a member of this association, said money so deposited to be used to cover the expense of the arbitration. It being understood, however, that the party in the wrong, as so found by said arbitration committee, shall pay all of the expense of arbitration, and said committee shall have the full power and right to assess the costs of arbitration to either one or both parties as they in their judgment may see fit. Said committee may, if they see fit, refund the money paid for purpose of arbitration to any party who has so paid in money. Any case on which an action in court is pending shall not be submitted to the committee on arbitration.

Fifth—When all of the requirements of section four have been complied with, the secretary shall refer the matter to the committee on arbitration for their decision. Said committee shall at their first meeting thereafter decide the case and render their findings in writing to the secretary, who shall at once notify the interested parties of such decision. It shall be the duty of the committee to tax the costs in each case in such proportion as they deem just and equitable, and their report of the case in writing to the secretary shall include a statement of the amount of costs each party is to pay. The parties to the case shall comply with the decision of the committee within thirty days after receiving notice of it from the secretary, unless an appeal is taken to the association in convention assembled, and the decision of the association as rendered on such appeal must be complied with not later than ten days after decision rendered and notice thereof.

Sixth—It shall be the duty of the committee on arbitration to hear and determine all cases submitted to it by the secretary within its jurisdiction and to render a just and equitable verdict thereon according to the evidence and the best of their ability. The committee shall have jurisdiction in cases arising in territory covered by this organization between members thereof, between its members and a non-member, by consent of the member. The members of the committee are not to be held responsible for errors of judgment in any respect whatever nor for any damage done nor any loss suffered by reason of their acts.

Seventh—The members of this committee before entering upon the duties thereof shall each subscribe to the following oath or affirmation: "I do solemnly swear (or affirm) that I will faithfully and fairly hear and examine all matters in controversy that may be submitted to this committee, and that I will make a just and equitable award or finding upon

the same according to the evidence and to the best of my understanding, so help me God."

Eighth—If the parties to a case submitted for arbitration desire to present the matter to the committee in person or by attorney, they may do so by paying whatever amount in addition to the amount provided in section four to be paid as shall be necessary to cover the additional expense of the committee, if any, of such personal hearing. The amount of the additional costs to be determined by the committee. All evidence submitted to the committee in person shall be given under oath when so required by the committee. Only members in good standing of this association or of a kindred association of this state may act as an attorney before the committee.

Ninth—When a case is referred to the committee on arbitration they shall fix a time for its hearing and notify the secretary of the date so fixed, which date so fixed shall be a sufficient time in advance to permit the secretary to give the interested parties and their attorneys five days' notice of the date and place of trial. The parties shall present all written evidence to the secretary on or before the date fixed for hearing and neither party shall postpone the hearing of a case longer than ten days after it has been submitted unless good cause can be shown therefor satisfactory to the committee.

Tenth—Notice herein provided to be given by the secretary shall be deemed completed service when such notice is mailed to the party's last known address, but the notice of date fixed for hearing shall be by registered letter.

Eleventh—The members of the commiteee on arbitration shall receive for their services five dollars ($5.00) per day for the time used in considering and deciding the cases submitted to them, also the amount of their traveling expenses and hotel bills.

Twelfth—The money received by the secretary to defray the expenses of arbitraion shall be by him placed with the funds of the association and the expenses thereof paid by him out of the general fund, but he shall keep a separate account of such receipts and expenditures. The secretary shall collect from the parties such amount as the committee may designate as the costs each shall pay for cases arbitrated.

Thirteenth—Neglect or refusal to submit a case in controversy to the committee on arbitration if so requested when the opposite party is a member of this association, or to comply with the award of the committee shall be deemed unbusinesslike conduct, and the penalty therefor may be a fine, suspension or expulsion as the executive committee may decide.

Fourteenth—In case either party desires to appeal from the decision of this committee to the association in convention assembled he shall so notify the secretary and pay to him such amount as the committee has taxed to him as costs, together with the further sum of twenty-five dollars ($25.00) for accruing costs, within five days after receiving the notice from the secretary of the decision of this committee. Failure to comply with the requirements of this section within the time specified shall forfeit all right of appeal.

Fifteenth—When, from absence or disqualification of any one or more of the regular members of the committee on arbitration, or when a quorum thereof cannot be formed, the president of the association shall be allowed to fill such vacancies with any member or members of the association who is willing to serve. A majority award or finding of any such committee shall be as binding as of the regular committee, and any award or finding of the committee thus formed shall be made under the same rules and shall have the same effect as if made by the regular committee of arbitration.

Sixteenth—In case any person neglects or refuses to submit a question in controversy to the committee on arbitration for decision or to comply with the award of the committee in which either party to the dispute is a member of the association, it shall be the duty of the secretary to at once notify all members of the association of such neglect or refusal.

The second day's session was opened by a paper on "The Recent Supreme Court Decision," read by Attorney J. C. Hume of Des Moines.

Miss F. B. Herr then read a paper on "Uniform System of Toll Accounts," after which on motion of Mr. Bellamy it was decided to bring together, at the expense of the association, the toll operators from a number of points in the state to compare notes and adopt some system for handling toll accounts.

The sessions of the convention closed with the election of the following officers: President, H. S. Herr, Ottumwa; vice-president, J. C. Sullivan, Creston; secretary and treasurer, Charles C. Deering, Des Moines; executive committee, the president, George N. Bandy, H. C. Raney, U. S. Alderman and J. S. Bellamy.

CONVENTION NOTES.

George W. Conover was in attendance at the convention.

The Central Electric Company, Chicago, was represented, but made no display.

The Valentine-Clark Company, Chicago, was represented by F. L. McGillan and E. L. Clark.

The J. C. Huebel Company, Menominee, Mich., was represented by J. C. Huebel, president of the company.

The Standard Underground Cable Company, Chicago, made no display, but was represented by E. J. Pietzcker.

The Telephony Publishing Company, Chicago, was in evidence, H. B. McMeal, president, being in attendance.

The Eureka Electric Company, Chicago, presented a complete line of its products in the way of telephones, supplies, etc., the exhibit being in charge of I. J. Kusel.

The Williams-Abbott Electric Company, Cleveland, Ohio, brought forth complimentary comments on its line of sample products. L. Sands represented the company.

The Monarch Telephone Manufacturing Company, Chicago, made a fine showing in the way of telephones and telephone parts. Exhibit was in charge of R. J. Hertz.

The Vought-Berger Company, La Crosse, Wis., represented by M. I. Berger, George F. Keefer and Mr. Reeves, devoted attention to its entire line of telephone products.

The Sterling Electric Company, LaFayette, Ind., exhibited its well-known line of telephones and switchboards. The exhibit was in charge of F. J. Rotchke and E. J. Dean.

The Chicago Telephone Supply Company, Elkhart, Ind., displayed its new type transmitter and a complete line of telephone apparatus, Stanley A. Duvall representing the concern.

The Illinois Electric Company, Chicago, represented by N. G. Harvey, Malcolm MacNeill and V. C. Littleton, displayed its line of "Peirce" specialties and a complete line of supplies.

The Western Telephone Manufacturing Company, Winthrop Harbor and Chicago, made a fine showing in the way of telephones and appurtenances and was represented by J. E. Keelyn.

The Kellogg Switchboard & Supply Company, Chicago, exhibit was in charge of W. R. Hind and R. S. Mueller. Its line of telephones, switchboards, etc., made a very creditable showing.

The American Electric Telephone Company, Chicago, had its usual line of telephones, switchboards and appurtenances on display. S. J. Baer and W. H. Haupton were in attendance in the interests of this company.

The Swedish-American Telephone Company, Chicago, presented a full line of telephones, switchboards and appur-

tenances, and was represented by E. B. Overshiner, C. H. Macklin, F. M. Ferguson and R. L. Scott.

The Holtzer-Cabot Electric Company, Chicago, was represented by E. R. Harding. Special features of the company's display were a special loud-ringing extension bell, linemen's test set and Bell style of desk set.

The McDermid Manufacturing Company, Chicago, displayed a full sample line of its products, among them being a new switchboard cord, "the cord that won't wear out." C. L. Burlingham, president of the company, was present.

The American Electric Fuse Company, Chicago, called special attention to its 200-pair main distributing rack, complete with self-soldering, self-restoring heat cartridge. This company was represented by F. G. Jones and J. A. Kenny.

The Ericsson Manufacturing Company, New York city, made a very fine showing, consisting of miniature common batteries, switchboards and a complete line of Ericsson apparatus. This company was represented by J. H. Montague, New York.

The Stromberg-Carlson Telephone Manufacturing Company, Chicago, exhibited its 280-line switchboard, also several styles of telephones and appurtenances. The company's exhibit was in charge of A. J. Rousseau, Daniel Pixey and William Bowen.

The Electric Appliance Company, Chicago, was represented by S. A. Dinsmore and H. E. Mason. This company displayed a new gold electrode transmitter and Noxem receiver. It also exhibited a full line of telephones and telephone supplies, including the "Eaco" dry battery.

THE INDEPENDENT TELEPHONE ASSOCIATION OF MAINE.

A meeting of the Independent Telephone Association of Maine was held at West Paris, March 9, 1903, and the following officers elected for the ensuing year:

President, Lewis A. Goudy, Northeastern Telephone Company, Portland.

First vice-president, R. L. Cummings, Citizens' Telephone Company, South Paris.

Second vice-president, P. C. Chandler, Pine Tree Telephone Company, New Gloucester.

Secretary, E. L. Durgan, Northeastern Telephone Company, Portland.

Treasurer, F. L. Wyman, West Paris and Curtis Hill Telephone Company, West Paris.

Executive committee: B. G. McIntyre, Waterford; John H. True, New Gloucester; Dr. F. H. Packard, West Paris; E. W. Gross, Auburn; E. L. Tibbetts, Lewiston; George H. Jones, Oxford; H. C. Cook, Casco.

The Independent Telephone Association of Maine is composed of the following companies: Northeastern Telephone Company, Pine Tree Telephone Company, Curtis Hill and West Paris Telephone Company, Bryant's Pond and Paris Telephone Company, Greenwood and Woodstock Telephone Company, Citizens' Telephone Company, Norway Local Telephone Company, Paris and Sumner Telephone Company, East Milton Telephone Company, Greenwood Local Telephone Company.

The association was organized in October, 1901, with Mr. M. S. Bird of the Eastern Telephone Company, Rockland, Maine, as its president, intercommunicating contracts having been made by the Eastern company with many of the rural and village exchange lines. A short time after these contracts were executed the Eastern company merged its interests with the New England Telephone and Telegraph Company, licensee of the Bell company. This action created a great deal of bitter feeling on the part of the rural companies, who had thus been duped into an alliance with the Bell company, who demanded the discontinuance by the Independents of their own transmitters, substituting therefor the Bell transmitters. The refusal to accept such conditions led to the Bell company refusing to transmit messages, which, in addition to increase of toll charges and advance in rates at certain points, created a decided agitation against the New England (Bell) company and the Eastern, its latest acquisition.

The Northeastern company is building trunk lines and installing large exchanges in the principal cities in Maine, beginning with Portland, and using the secret service automatic system (Strowger patents) for its large village exchanges and rural service. It is claimed that it will expend nearly one-half million dollars on its new exchanges and installation of its system in Maine and New Hampshire during 1903. It is an aggressive representative of the rural independent companies, which it is working in harmony with for the expansion of Independent telephony.

INDEPENDENT TELEPHONE COMPANIES FORM ASSOCIATION.

The several Independent telephone companies operating in Oklahoma and Indian Territories met recently at El Reno and formed an association known as the Oklahoma Independent Telephone Association. The purpose of the organization is the further development of the Independent telephone interests in Oklahoma and Indian territories. The organization as a body adopted a constitution and by-laws, and the next regular meeting will be held in Oklahoma City.

The following is a list of the officers elected for the ensuing year: President, W. J. Steele, Kingfisher, Oklahoma; vice-president, G. H. Patterson, Elk City, Oklahoma; secretary-treasurer, Dr. Davis, Weatherford, Oklahoma.

Executive committee: President Steele, chairman; W. T. Talley, Granite, Okla.; F. A. Dinkler, Hennessey, Okla.; Mr. Rhyne, Walivera, Okla.; Dr. Davis, Weatherford, Okla.

The association is composed of the following Independent telephone companies: Mangum Telephone company; Granite Telephone company; Washita Telephone company; Central Oklahoma Telephone company; Oklahoma Southwestern Telephone company; Watonga Telephone company; Reed Telephone company; Geary Telephone company; Smith Telephone company, Elk Telephone company, Kingfisher Telephone company, and the Topeka and El Reno Telephone company.

ANOTHER RAILWAY TELEPHONE.

A Paris correspondent of one of the London newspapers gives an account of a system invented by a Spanish engineer, by which constant communication may be maintained by telephone between moving trains and signal stations.

Upon each train a modified telephone receiver and transmitter is fitted. To one of the axles of the engine or guard's van a small dynamo is attached, developing the required electric energy, while a shoe or trolley affixed to the axle trails along a special wire, which has to be fitted along the track and the holders of which are driven into the sleepers.

As with the block system, the line is divided into sections, and at each section end, which may be a relay station or signal box, there are fitted special telephone transmitters and receivers. By these means the shoe which slides along the wire forms the circuit with each section end, and persons in charge of either signal box or station can at any moment establish communication with the driver or guard of the train. By an ingenious device, if a second train gets on to any section before the first train has left it, alarm bells ring upon both trains.

The probability is that all this will be done before long, by wireless telegraphy, if it be thought worth while. It seems to give additional assurance of safety, but offers no security against human carelessness, the prime factor in most railroad calamities.

Michigan Independent Telephone Convention.

The annual convention of the Michigan Independent Telephone Association, notice of which was given in the March issue of TELEPHONY, was held in Lansing, Mich., on Thursday, February 26th.

The meeting was opened with the annual address of President J. B. Ware, which drew a very strong comparison between the Independent and Bell companies of the state of Michigan and tended to show that the Independent movement in Michigan is making very strident steps towards the goal to which all Independent telephone men are aiming.

President Ware spoke, in part, as follows:

During the year past, marked differences have been noticed from time to time, as to the condition of the Independent companies and the Bell company in this state.

The former have continued to increase in number of telephones and in favor with the people; dividends have been paid with the same regularity which has been the rule in the past and as in the preceding years, financial remisses have not overtaken any of the companies.

With the Michigan Bell Company, continued error in policy has been pursued as in the past. On July 1st, interest was defaulted on the $5,000,000 of bonded debt, and on August 1st the same occurred as to the $595,000 of bonds of the Detroit Telephone Company which were guaranteed by the Michigan Bell at the time of the sale to that company three years ago, together with certain telephone properties by about a dozen citizens of Detroit and Kalamazoo who thought more of a quick profit, than they did of business honor or loyalty to business associates.

Since July 1, 1902, officers of the Michigan Bell Company have expended large sums of money in trying to improve the company's property and system, which money belonged rightfully to the company's bond holders. That such expenditure was warranted is very doubtful; that the standing of the company with the people of the state has not been improved seems unquestioned, and the appointment of the Union Trust Company of Detroit as receiver on February 24th is the long expected outcome as the only natural result of the Bell policy.

This is the first Bell company to go into the receiver's hands. Several others have long ceased to pay dividends and have had great struggles to keep up interest payments, and it seems fair to anticipate other Bell companies may travel the same road that has the Michigan Bell Company.

While this will not cause surprise to many active telephone men who have known the blunders and errors of the parent and licensee Bell companies, yet it is extremely unfortunate that large telephone interests should be financial failures, when, for the first time, capital can be invested in Independent companies without fear of patent troubles or risk of litigation.

If the people in the East understood, as do the people in Michigan, that the Bell companies no longer have apparatus superior to that used by opposition companies and that Bell licensees cannot furnish service as cheaply as can their opponents, owing to Bell royalties, to larger general expenses, to over-capitalization, to inferior construction with which to compete with modern and improved construction and apparatus;—if these matters were understood, every Bell company failure would make those money interests that are not tied up to Bell securities more active in supporting Independent interests than they will be inclined to do when the facts are not properly known.

That the East has awakened somewhat to the situation and the advantages gained through the Independent movement, is perhaps as clearly indicated by the recent rapid development in the state of New York as in any case that can be cited.

Although unable to give a complete list of cities in which Independent exchanges have been built in that state during the last year, the following are among such cities and towns: Buffalo, Binghamton, Troy, Penn Yan, Hornellsville, Utica, Jamestown, Medina, Watkins, Cohoes, Waterloo, Olean, Oneonta, Albany, Geneva, Corning, Newburgh, Salamanca, Batavia, Ithaca, Saratoga, Newark, Seneca Falls, Dunkirk, Schenectady, Canandaigua, Elmira, Poughkeepsie, Wellsville.

These, and other cities built previously (such as Rochester, Syracuse, Niagara Falls, Rome, Herkimer, etc.) are being connected by long distance lines now about completed, some using 30-foot 8-inch top poles, 40 to the mile, with No. 10 copper circuits, and plenty of them.

Thus New York state, which has to-day nearly 50,000 Independent telephones in operation, will, before January 1st next, probably have very close to 100,000 Independent telephones; and the Independent interests will occupy practically every city, town and village, except New York city, in which, I believe, an Independent exchange is inevitable.

The East is thus awakening, and it is not an idle dream to perceive in the near future a long distance service and telephone development that will be adequate to the demands of the nation's citizens, as the culmination and outgrowth of the Independents in many states, prominent among which are many Michigan men.

While the most important event, during the year, has been the final decision in the Berliner patent suit, and a sweeping defeat to the Bell company, yet such was the Bell influence on the Associated Press, that the merest mention was made of the decision, other than in the electrical magazines.

With patent litigation ended, as far as broad basic patents are concerned, we may well consider the first period in modern telephone history as ended.

The problems arising from time to time have been honestly met and solved. The ability of the people to furnish themselves with better telephone service and at less expense than could be done by a monopoly has been demonstrated and recently has been proven the legal right of the people of the United States to develop this great necessary business factor and public convenience to all classes. What magnitude such development will reach probably cannot to-day be comprehended. Some years ago, other than those owned by the Bell companies, there was not an exchange of 500 or more telephones in operation and less than a score with a hundred instruments in operation.

In several states, the Independents have more exchanges, telephones and toll circuits and mileage than have the Bell companies. From sources believed to be reliable are obtained figures from which we make from three states, the following comparisons as to telephones in service:

State.	Bell.	Independent.
Ohio	86,000	121,000
Indiana	32,000	78,000
Kansas	11,000	39,000
Total	129,000	238,000

While other states could be named where similar conditions exist, accurate figures are not at my command. Thus in five years, the people for themselves have accomplished more in the development of the telephone benefits, and the business itself, than have all the Bell companies during the last twenty years of their existence.

Perhaps the future has greater problems in store for us than we suspect. We do, however, feel safe in planning for a greater development with the very best service possible for all subscribers, whether in cities, villages or rural communities.

This means larger investments and reconstruction in some instances. Because of these conditions and others, there will necessarily be changes in rates in certain exchanges, where the rates were established for smaller exchanges and with inferior construction.

As a rule, however, in place of a change of rates, will come a more perfect systematizing of the business and a closer study and application of telephone economics, with the result of, perhaps, not reducing the expenses of operation (which I believe can and will be accomplished, however) so much as the increasing of the volume of business. Special services are needed by our patrons not heretofore given, which will, not alone benefit ourselves, but secure to us even greater public favor. So great has been the struggle to care for the business offered us, we have had little time for the consideration of many questions that have arisen.

The time has arrived, however, for such consideration, and I confidently look for solutions of problems of depreciation and operation without, as a rule, resorting to a rate charge.

Especially is this to be the case in the toll line business, where, with more economy of time in handling messages, less expensive record keeping and manner of settlements, and the securing of additional circuits, and facilities at nominal expense, and affording thereby a wonderful increase in business and income; all these and others will make our next five years as progressive and satisfactory to ourselves and to the public as has been the last five years.

At this point it is well perhaps to consider briefly the Detroit situation and a few of the facts connected with the history of Detroit misfortune.

In 1894 Mr. R. E. Brett undertook to establish an Independent company in Detroit. A canvass of the city resulted in securing over 3,000 telephone contracts at these rates: Business, $50; physicians, $40; residence, $30. The Bell rates were $120 and upwards for long distance telephones, and $72 upwards for Blake telephones, with less than 2,500 telephones in service.

The rates proposed by Mr. Brett were great reductions, yet when the franchise was desired, its rates were opposed by Bell influences and by physicians—the latter being a class that receive all business over the telephone and yet is frequently least willing to pay reasonable rates for telephones of any class.

Mr. Charles Flowers was retained by Mr. Brett as attorney, but was unable to prevent great delay on the part of the council in acting on the franchise, or to prevent the rate being made $40 for business and $25 for residence—rates which Mr. Brett claimed were too low and which were adopted by certain members of the council in order to kill the franchise, so I understand.

When the franchise finally passed, December 4, 1894, with the rates of $25 and $40, it was refused by Mr. Brett who abandoned his efforts. Then it was that Mr. Flowers undertook to secure a franchise at the low rates named and on March 14, 1895, did obtain such franchise for the Detroit Telephone Company.

In view of the character of construction of the plant and the small investment in connection therewith, it is scarcely a question that the plant would have proven profitable if properly handled. Several things indicate that it was not the intention of Mr. Flowers and his associates to operate the plant, one of which is that for a period of at least five months after the toll lines were connected with the Detroit exchange bills for state line service had not been made against subscribers. At the time of the sale of the Detroit exchange there was over $25,000 owing by subscribers for rentals and tolls.

The plant had been built by a bond issue, so that the few gentlemen who held the control of the stock had little invested in it.

Their New State Company was making money as was the Kalamazoo properties when sold, so that the fact remains with all allowances that it was not because the investments were bad ones that a dozen men sold out these properties against the wish of hundreds of stockholders, but because these few were without ordinary business honor, and probably did only what was originally planned. The Detroit company never attempted to secure a franchise amendment as to rates. Mr. Flowers claimed a telephone franchise to be absolutely worthless, and yet in the interest of the Bell company has opposed a franchise at rates that would enable the installation of a successful Independent company.

R. T. Johnson, manager of the Valley Telephone Company, Saginaw, Mich., then read a paper on "Clearing House," which was a clear and concise statement of the problem confronting the toll business. This paper was in the form of an agreement to be signed by the various connecting toll lines and was at once referred to a committee of five and given full power to act upon Mr. Johnson's paper.

Messrs. Fisher of Grand Rapids and Fielder of Alma, Mich., then discussed in detail the matter of "Clearing Houses."

At the opening of the afternoon session a carefully prepared paper was presented by C. E. Tarte, general manager of the Citizens' Telephone Company of Grand Rapids on "Night Rates and Three-Minute Service." This paper, which should have been read by H. H. Robinson of Cleveland, who could not be present, brought forth no little discussion. Dr. Root of Hart, Mich., said he considered the night business was greater between the hours of 6 and 8 p. m. and 6 and 7 a. m., and that it would be better in case night rates were to be applied to have them between the hours of 8 p. m. and 6 a. m. Regarding the three-minute rate he thought too much time was taken for identification of the conversing parties for it to be practical. Mr. Tarte argued that the aforesaid hours did not compare with the service between 1 and 2 p. m., and the opinion of Mr. Tarte was voiced by Mr. H. A. Douglas, manager of the Citizens' Telephone Company of Jackson, Mich., he recommending a one-minute rate, which is the rule with the competitor in Mr. Douglas' field.

The theme of other discussions upon the subject was that the night rate should be extended to Saturday business. Said discussion was ended by the matter being referred to the committee that was appointed to handle Mr. Johnson's paper on "Clearing Houses."

"The Necessity of Independent Connection to Detroit Business Men" was read by Stanley Parkhill of Owosso, Mich., who presented in a full and forceful manner the advantage Detroit business men would gain if an Independent exchange were established at that place. Mr. Parkhill told of the disadvantages which must, of necessity, be contended with through the use of the present system,—namely, the Bell.

H. E. Adams of the W. G. Nagel Electric Company, Toledo, Ohio, presented a paper entitled the "Toledo Exchange," in which the detail history of Independent telephony in Toledo was given. His paper went far to show that the Home exchange of that place was highly successful.

W. O. Hart, vice-president and general manager of the Adrian Telephone Company, Adrian, Mich., gave a very

interesting talk on "Rural Telephone Connections." Others who ably discussed this subject were Messrs. Douglas of Jackson and Wing of Grass Lake, Mich. The latter gentlemen thought they had been altogether too slow in making farm line connections, and upon this point nearly everyone present agreed with the speaker.

The question of initiation fee then came before the meeting and it was recommended by Mr. Fisher of Grand Rapids that the fee be placed at $1.00, and that annual dues be based upon the following schedule: 200 telephones or less, $1.00; from 200 to 500, $5.00; 500 to 1,000, $7.50; 1,000 to 2,000, $15.00; 2,000 to 5,000, $25.00; 5,000 to 10,000, $35.00, and over 10,000, $50.00.

At this point the treasurer's report was read, showing a healthy financial condition of the association. Mr. J. B. Ware tendered his resignation in the association, which was accepted. He was voted hearty thanks for his entire efforts in its behalf during his several years of service.

The following officers were then elected: E. B. Fisher of Grand Rapids, president; B. F. Johnson, Saginaw, Mich., treasurer; C. F. Brown, Alma, Mich., secretary.

Judging from the attendance and interest shown at the meeting, this has been the most successful one of the Michigan association. Steady improvement in affairs has been going on and in view of the fact that the Michigan Bell Company went into the hands of a receiver recently, the Independent prospects were never better.

CONVENTION NOTES.

C. J. Litscher represented the Illinois Electric Company of Chicago.

The F. Bissell Company, Toledo, Ohio, was represented by M. S. Walker.

The Kellogg Switchboard and Supply Company, Chicago, was represented by R. S. Mueller.

R. R. Abbott was in attendance, as representative of the John A. Roebling's Sons' Company of Chicago.

H. E. Adams and J. B. Darragh were in attendance in the interest of the W. G. Nagel Electric Company, Toledo, Ohio.

F. W. Pardee, general manager of the Chicago Telephone Holder Company, Chicago, was in attendance at the convention.

A. B. Smith represented the Stromberg-Carlson Telephone Manufacturing Company, Chicago, Ill., and Rochester, N. Y.

The following list shows about seventy representatives of the various Independent telephone companies of Michigan present at the convention:

F. E. Backus, Livingston Home Telephone Company, Howell; John H. Tripp, Kibbie Telephone Company, Kibbie; E. B. Fisher, Citizens' Telephone Company, Grand Rapids; H. A. Douglas, Citizens' Telephone Company, Jackson; John Rentz, Blissfield Telephone Company, Blissfield; F. C. Hughes, Citizens' Telephone Company, Lansing; W. S. Vivian, Citizens' Telephone Company, Lansing; C. E. Tarte, Citizens' Telephone Company, Grand Rapids; F. E. Cole, Citizens' Telephone Company, Ionia; W. O. Hunt, Adrian Telephone Company, Adrian; F. S. Phillips, Ogden; C. W. Cook, Rives Junction; E. B. Lee, Weston; E. G. Stacey, Twin City Telephone Company, Benton Harbor; F. G. Howard, Grand Rapids; J. E. McElvain, Hastings; J. C. Furniss, Nashville; C. H. LaFlamboy, Union Telephone Company, Alma; R. F. Johnson, Valley Telephone Company, Saginaw; J. B. Ware, Detroit; C. F. Brown, Union Telephone Company, Alma; George G. Root, G. P. Hyde, H. S. Newton and George A. Hawley of the Oceana Telephone Company, Hart; A. A. Burch, Citizens' Telephone Company, Greenville; Geo. F. Statemeyer, Calhoun County Telephone Company, Battle Creek; A. Stacey, Citizens' Telephone Company, Grand Rapids; S. E. Harmer, Citizens' Telephone Company, Coopersville; John W. Perkins, Oceana Telephone Company; G. H. Weed, Citizens' Telephone Company, Lake Odessa; C. T. Babcock, Union Telephone Company, St. Johns; Stanley E. Parkhill, Union Telephone Company, Owosso; William Robinson, Citizens' Telephone Company, Muskegon; W. H. Orr, Citizens' Telephone Company, Holland; D. H. Owen, Citizens' Telephone Company, Lowell; Frank M. Howard, Valley Telephone Company, Flint; John H. Fildew, Union Telephone Company, Alma; F. F. Helbesh, Woodland; A. A. Cowles, Co-Operative Telephone Company, Detroit; J. E. Hisey, 'Phone Exchange, Lansburg; J. B. Lockwood, Citizens' Telephone Company, Lansing; C. E. Smith, Citizens' Telephone Company, Vermontville; D. John Berry, Citizens' Telephone Company, Kalamazoo; W. E. Baum, Mutual Telephone Company, Springport; J. H. Palmer, Sunfield Telephone Exchange, Sunfield; P. M. Kent, Sunfield Telephone Company, Sunfield; Edgar Daykin, Deerfield Telephone Company, Deerfield; Nelman F. Wing, Farmers' Telephone Company, Grass Lake; W. H. Graves, Leslie Telephone Exchange, Leslie; R. B. McPherson and O. I. Parker, Livingston Home Telephone Company; F. N. Monroe, Williamston; Dr. J. C. Buell, Rives Junction; George A. Hawley, Oceana Telephone Company, Hart; John M. Fuller, Union Telephone Company of Alma, Henrietta; A. J. Curtiss, Citizens' Telephone Company, Kalamazoo; C. E. Marsh, Valley Telephone Company, Saginaw; B. L. Carson, Valley Telephone Company, Bay City.

TELEPHONE EXCHANGE IN CHINATOWN.

One of the unique features of the far-famed Chinatown of San Francisco is the Chinese "hello girl." The Oriental folk, quick to adopt the ways of the American, have long recognized the convenience of the telephone. For years most of the rich Chinamen have used telephones, but pigeon English talked over the wire to central had its disadvantages. "You catchee him, led-fi seblen—you sabe—fi seblen-led, fi—oh, you heap sassy now—you sabe him—fi, etc," with four others on the ten-party line trying to get a number, not only created trouble with central, but also encouraged profanity along the line. However, to business-like "John" time is just as valuable as to the American financier, so he decided to waste no more time with the "Melican" central. An appeal was made to the telephone company. The result was the establishment of a branch office situated in the heart of Chinatown and the employing of Chinese operators.

That was two years ago. Since that time over five hundred telephones have been placed in the Oriental quarter, nearly every business house of importance being a subscriber. The office is fitted up in luxurious style, with polished floors, ebony furniture, and elaborate carvings so dear to the Chinaman. At the switchboard five girls and as many boys, all native sons and daughters, are employed. The girls, with their elaborate coiffures, their jewels, and pretty flowing gowns of gay colors, present a charming picture. Voices of clear falsetto ring over the telephone with metallic precision. There is no fussing, no flirting, each little maid being as demure as a nun. There is no trouble about wrong switches, for one of the characteristics of the Chinese is that, when a duty is once mastered, it is always performed with mechanical accuracy. The officers of the company say that a mistake in the books of a Chinese bookkeeper is a very rare occurrence, and that a complaint of central is absolutely unknown. On the side of the room opposite the switch-board a Joss is installed, and from the incense-burners tiny columns of perfumed smoke curl up, pervading and purifying every corner wherein an evil spirit might lurk in contemplation of mischief.—*Leslie's Weekly.*

It is with pleasure that I remit $1.00 for one year's subscription to TELEPHONY. It is the best telephone journal published.—ARTHUR R. LEACH, Lyons, N. Y.

Abstracts of Telephone Convention Papers.

HOW CAN WE PROTECT ONE ANOTHER'S INTERESTS?

In order to protect anything for some one else we must discard all selfish motives and thoroughly realize that our mission in this world is not how much gain we can make for ourselves, but how much good we can do.

The several Independent lines are the natural outgrowth from the oppression practiced by the Bell system. The pecuniary or profit-making interest should not be the only aim for Independent companies. Our calling is of a higher order. As with an individual so should it be with a corporation. The highest aim in its life should be to do all the good possible. It should take only such compensation as is necessary in order to give good service and make the investment successful. Neighbor Independent companies may be mutually benefited by working in harmony in regard to covering new territory. No company should deem itself in the right to establish itself in a county where another company has previously built its lines without consulting the same and making satisfactory arrangements as to connections, etc.

The question "How Can We Protect One Another's Interests?" as put by the program committee, is, in my opinion, cut a little short. The committee undoubtedly wished a paper on "How Can We Protect One Another's Interests Without Sacrificing Any of Our Own?" Our brotherly love ordinarily is not of that caliber to largely sacrifice our own interests in order to help a neighbor, and until we reach that blessed stage our efforts in protecting one another's interests will always have this "if" in it, that *if* it can be done without being injurious to ourselves.

The fee for service should be the same on all Independent lines. Trifling trouble on a toll line connecting with an exchange should be fixed by the lineman having charge of the exchange. Any irregularities or unfaithfulness from the employes coming to the knowledge of one company should be promptly reported to the company suffering the abuse—in short, the golden rule applied to do as we wish to be done by cannot fail to materially benefit us all, and prove that our judgment was correct in investing our time and money in Independent telephony.—*Fred Pluggenkule of Sumner, Iowa, before the Northwestern Iowa Independent Telephone Association at Independence, Iowa, Feb. 10-11.*

WHAT MATERIAL AND CONSTRUCTION SHOULD CONSTITUTE THE STANDARD RURAL LINE IN NORTHWESTERN IOWA?

There are two classes of lines, known as metallic and grounded lines. A metallic line is one on which the current goes and returns on wires which make a complete circuit from one telephone out to the other telephone, or to central over one wire and back again over another. This is known as a metallic circuit, from the fact that the current travels all the way, going and coming, over a metallic path.

A grounded line is one on which only one wire is used, the earth or ground taking the place of the other wire used on a metallic circuit. The current thus travels over one-half of the circuit on a wire and over the other half through the ground.

A grounded line is much cheaper in construction than a metallic, as it requires only one wire instead of two. It gives very fair service on short rural lines, but does not give good results on long lines or in cities or towns having many telephone lines or electric light or power wires, which invariably interfere with the working of telephone circuit.

Either hard drawn copper or galvanized iron wire is ordinarily used for telephone construction. Copper is a better conductor than galvanized iron, but is much more expensive. The difference in the cost of the two is much greater in the quality of service given, and as a consequence most rural lines and small exchange systems are built with iron wire, while the larger exchange systems and very long lines use copper wire, which, though more costly, gives the service which the iron wire will not give on such lines.

Besides the difference in conductivity or current carrying capacity just mentioned as existing between different kinds of metals there is also a difference in the conductivity of different sizes of the same kind of wire.

A wire one-eighth of an inch in diameter will carry the current four times as easily as a wire one-sixteenth inch in thickness. The same proportion governs in all sizes of wire; also the longer the wire the less easily does it carry the current, this being directly proportioned to the length of wire used.

Suggestions for building telephone lines as to the required material depends on how many wires said line is to carry. If for cross arms I would suggest 25 foot poles, 6 inch top; 35 to 40 poles to the mile should be considered a standard line. If a bracket line 5-20-5-25, twenty-five poles to the mile should be considered a standard rural line.

Poles should be roofed and grained and painted, brackets should be 1½ inches, well painted.

My observation of the various methods of line construction leads me to believe that there ought to be more uniformity in rural line construction to attain the best results. However, I propose to conform to association methods and will abide by the decision not only in this matter but all others that tend to better our condition and the service.—*J. F. Van Voes, Independence, Iowa, before the Northwestern Iowa Independent Telephone Association at Independence, Iowa, Feb. 10-11.*

RIGHTS OF TELEPHONE COMPANIES IN THE HIGHWAYS, AND THE POLICY TO PURSUE IN THE EXERCISE OF SUCH RIGHTS.

Telephone companies are limited as compared with what should be their rights.

I am assuming that we should be entitled to a great many rights which are not accorded us legally and inasmuch as the service of telephone companies is necessarily a "public service" similar in its relation to the public to other public service enterprises, such as gas plants, electric light plants, electric street railway plants and water companies as a public carrier (pro boni publico), it is but proper that the rights enjoyed by these other enterprises should be taken into consideration as compared with the rights we should enjoy.

The privilege of right of way is granted in each of the before mentioned cases by public official authorities actuated by public opinion and in the granting of franchise it is common practice of public official authorities to specify "that subsequent franchises of a similar character granted to subsequent parties shall in no manner conflict with the privileges granted to the original company."

This particular clause is the only universal clause appearing in franchise referring to equal rights to all companies. In the case of gas plants the right of way under the streets of a municipality is generally granted after due consideration has been taken regarding the contemplated location of their pipes as they may conflict with water companies either present or contemplated. A municipality should have due regard for its inhabitants in the matter of protection to life and property. A telephone company should be considered the least dangerous of all other public service enterprises using the public highway.

It is generally considered and legally held true in several instances, that when once established on the public highway a telephone company's domain extends along one side of that highway without interruption and upwards as high as it is possible to extend its poles, and should in no manner be disturbed by an electric company's wires or any other company using similar methods for the distribution of its commodity.

The use of the highway by pedestrians and vehicles has by custom long been established and one seldom hears of litigation between pedestrians regarding their separate rights. The same may be said of vehicles, including bicycles and automobiles, and yet often an electric light company engages in legal conflict with a telephone company in dispute of right of way to the extinction of one or the other.

I have been able to discover only one section from the legal code of this state which fixes definitely a penalty against the transgressor who may interfere with the rights of telephone companies on the highways, namely, in 4807, as follows:

Section 4807. If any person maliciously cuts, burns or in any way breaks down, injures or destroys any telephone post, or in any way cuts, breaks or injures the wires or any apparatus thereto belonging, he shall be imprisoned in the penitentiary not more than five years or be fined not exceeding $500 or imprisoned in the county jail not exceeding one year. This only refers to the malicious transgressor.

The Western Union Telegraph Company wisely secured from Congress a right of way along the highways throughout the United States for its poles and wires for the purpose of transmitting intelligence and information and inasmuch as the telephone is the more modern and soon to become the more universal method of transmitting this commodity it is but proper that Congress should have due regard for her constituents and likewise legislate for us similar privileges and protection. Congress has wisely considered the best interest of the public in the right of way privileges granted for the transmission of intelligence through the United States mail, and the offense of interrupting the transmission of a single two cent letter is punishable by imprisonment.

What are the consequences when two passenger trains approaching each other carrying the United States mail use the same right of way? Compare with the consequences when the wires of a telephone system carrying intelligence comes in contact on the same right of way with the wire of an electric light system of 5,000 or 10,000 volts pressure. In the one case it is death and destruction to property throughout the entire territory of distribution.

The state protects the lives of its inhabitants by granting the supreme power to its board of health. Why should she not appoint a commission for the protection not only of the life but of the property of its inhabitants by the regulation of the wires along the highway?

As a policy to pursue in the exercise of our rights I would suggest that we as an association, as public servants, as individuals, should strive to enlighten the public at large to the importance (to them) of our calling and that our rights along the highway should be second only to the rights of the United States mail and when we have accomplished this the public's best interest will be best served by us.—*George T. Hewes, of Waterloo, Iowa, before the Northwestern Iowa Independent Telephone Association at Independence, Iowa, Feb. 10-11.*

DO WE NEED A BOARD OF ARBITRATION?

Some of the interests which this association seeks to protect are not under protection of the laws of our state, namely, to establish a uniformity of service and rates, an establishment of through lines and efficient long distance service, proper divisions of tolls and perhaps establish a clearing house or checking bureau, and numerous other interests for mutual benefit of ourselves; and for systematic and uniform service to our subscribers, to form an association to cover as much of the country of the northeastern portion of the state of Iowa as possible and under practically one management to the end, that we only connect with one company in one territory, saving different Independent companies from ruinous competition, and the subscribers the expense and nuisance of a double service, of two exchanges in one territory. To accomplish this end I take it that it is as necessary to have an arbitration board as in our government it is to have a court to settle equity cases to protect property rights of citizens.

The more effectual the organization the better we can protect each other's interests, and the only way to make it effectual is with equitable and practical rules and a board of arbitration to settle difficulties which are bound to arise and make the organization effectual. From the position I take there can only be one answer to the question of "Do We Need a Board of Arbitration?" and that is, that we do. With the large extensions being planned and executed requiring a large amount of capital invested in the various telephone systems, it is nothing more than right that these interests should and of right ought to be protected. It is quite possible that an arbitration board might save some of our members within this territory thousands of dollars in ruinous and unnecessary competition, besides being a nuisance to the community.—*E. C. Hampton, of Marion, Iowa, before the Northwestern Iowa Independent Telephone Association, at Independence, Iowa, Feb. 10-11.*

A UNIFORM SYSTEM OF TOLL LINE ACCOUNTS.

With so many different companies carrying their toll lines over more lines than their own, it becomes vastly necessary for harmony and uniformity. Some of these companies pay the other companies for the carrying; some pay terminal fees, some, pro rata mileage, while another portion keep all the tolls coming in, and expect each and every other station to do the same. Perhaps it is fair and perhaps it is not, to follow the last method. But for the benefit of those who do pay, it is important that all records should be kept in the same way, that there may not be a discrepancy at the end of the month. Along with keeping the reports in a uniform manner, it is necessary to check with more than one station if possible.

The value of checking is seen by some of the larger companies, and they demand that all reports come in to the central office by the 5th of each month. When the reports are received, they are arranged alphabetically to facilitate the work, which is taken in hand by two or three persons and checked as follows: Smithville reports two messages sent to Brownsburg and six received; the clerks look at the Brownsburg report and find eight messages sent, two of which were reversed messages, also two messages received. Evidently Smithville collected for those two reversed messages and did not send St. Louis its proper share of the money. A check is made at this point and the work proceeds, until all reports are checked in this way. Then error sheets are made out and sent to the companies in whose reports errors have been found. If Smithville denies receiving the two reversed messages from Brownsburg, then Brownsburg is asked for copies of these tickets. Now, if Brownsburg does not have these two tickets for any of the many reasons which may be given, it becomes her duty to collect for them. This takes work and care, and keeps the report a month behind, but a more even and just settlement is made. And since there is not a single station or large company owing the principal lines in Iowa, it becomes necessary for the stations to check with each other.

The Ottumwa Telephone Company has checked weekly with a number of companies, all of whom do not make monthly settlements, but for mutual helpfulness, the checking is made. The system is explained in the following: Fairfield reports on Monday, March 20, three messages received from Ottumwa; Ottumwa has one message sent. Fairfield is asked for copies of the tickets on that day, and here, Ottumwa finds her one good ticket, and also that she has one marked N. G., while the third cannot be found at all. Since the message was sent only a week before, and since the time is also marked on the ticket, the clerk can go to the operator who was on duty at that time and ask if she knows anything about these tickets. "Why, yes, Mr. B. talked to Fairfield last Monday. Don't you find the ticket?" "Well, why is this ticket marked N. G.?" "Well, they talked so short a time, that I thought they did not get their parties." Now, Ottumwa can collect for those two messages, which otherwise, would have been lost.

If Fairfield reports eight sent messages, and Ottumwa has nine good tickets received, the clerk copies the nine tickets and from the copies Fairfield can find the missing ticket and collect toll which would have been otherwise lost.

The toll reports should be kept in the same manner, and in taking up the points under toll work, first consider the operator. Girls with good carrying voices, heavy enough to be heard easily should be selected, and they should always use the rising inflection. Promptness and dispatch should be used in giving messages to one operator by another, always giving the name and telephone number of the party calling, as well as the people called. If in case of the Fairfield messages mentioned before, these two missing tickets had come back to Ottumwa in this way: central (Ottumwa) to No. 71, Fairfield and central (Ottumwa) to No. 942 Fairfield, Ottumwa would surely have lost those messenger fees since Fairfield could not be asked to inquire to whom No. 71 talked on March 6.

A uniform time for beginning and closing the day should be adopted. A few companies close the day at 6 o'clock, in order that reports can be made and mailed Saturday evening, reaching the other offices Monday afternoon or Tuesday. All tickets after 6 o'clock p. m., should be dated the day following. An advantage of closing the day at 6 o'clock p. m. is the amount of clerical work which the night operator can do, thus saving the crowding of the chief's day.

Each station should keep account of all calls. Some destroy all the through calls and all the calls which failed during the day, but this should not be done, as sometimes one station marks a ticket N. G., when the other station knows that the call was good. Then they should keep the tickets long enough to cover the statutory reserve. In two years a great many tickets will accumulate, but by having the original ticket, the company may save itself a lawsuit or other disagreeable complication, if one year from a certain date, or even two years from that date, the original of that ticket can be found.

A good way to keep these tickets is in boxes made specially for the purpose, which are just wide enough for the ticket and long enough to hold a month's work. They can then be kept together and arranged alphabetically in stations, having a heavy blank card between each station. Then, if it is desired to know how many calls were sent to Washington or Davenport on March 9, look under the W's and D's for Washington and Davenport; take out only those tickets, and do not disturb the others, and when they are counted put them back in their respective places. To arrange the tickets in the box, classify them as "sents," "reversed," "dead heads" and "N. G.'s" and arranging those received in the same manner—"good," "reversed," "dead heads" and "N. G.'s," following this classification with the "through" tickets. Place them each day in this order in the box. At the end of the month put the box away, and at the end of two years there will be twenty-four boxes of tickets, arranged in an orderly manner, permitting of ready access.

Now, in regard to keeping the record of these tickets, I have prepared a blank, which seems to be a simple method of keeping the record of all the tickets possible. The blank is of a size that may be kept in a binder which may be found at any stationers. The dates are printed on the left hand side. At the top of the blank is a place for "stations," "rates" and "month." The body of the blank is divided into "outward," "inward" and "through," and "through stations." The "outwards" are divided into "No. mess.," followed by a narrow blank space, then "Mess. fees," then reversed, following comes "dead heads." The space marked "inward" is divided in the same way. The space "through" is divided into "No. mess.," and "fails"; "through station" is left blank for writing the name for which the message was sent. The date may be written lightly along the margin so that there can be no doubt as to the date of any given "through," without looking at the ticket. The space immediately following the number of messages is left for correcting a message after the checking of another station has been done. The blanks used for weekly checking with other companies or stations should be a facsimile of this monthly report.

A few stations are pro rating through messages, when there are a large number of stations in two systems and the companies pay two or three mills a mile, the pro rate can be easy found by adding the number of miles in each system. But when there are only a few

stations and they pro rate the tolls collected according to miles of wire, the problem may be computed differently. One method of determining the pro rata due each company, is to measure the wire miles according to the route book, then find the amount of miles belonging to your company and the company with which you are making a settlement. The difference between these would be the number of miles belonging to other companies. Take your rate by measuring their line. The problem now becomes a very simple one. The amount due each company, per mile, is as much as the total number of miles is contained times in the toll rate charged. Then your mileage will be as much as your whole number of miles of wire multiplied by the amount per mile, which is usually a fraction. Our's will be found in the same way. The difference between the sum of your mileage and our mileage will be the pro rata due other companies.

To illustrate specifically, we will take the station of Bloomfield to Des Moines, which routes through Ottumwa, Oskaloosa and Knoxville and Grinnell. The total number of miles is 92! Bloomfield's miles, 17. Ottumwa's miles, 16. Other miles, 59. The rate is 60 cents. The message is one. The total pro rata is 60/92 or 60/92 of 1 cent. It is now a simple problem in fractions; multiply 60/92 by 17 and the result is 11 2/23. Call it 11 cents; this is Bloomfield's pro rata of one message. Multiply 60/92 by 16 (Ottumwa's miles) and the result is 10 10/23. Call it 11 cents. The amount remaining is 38 cents. This should be divided between two or three other companies but as we are only settling with the Davis County, we do not claim anything more than 11 cents due us. If Oskaloosa or Knoxville settle with Bloomfield, they are entitled to their share per mile of the remaining 38 cents.—*By Flora B. Herr, of Ottumwa, Iowa, before the Iowa Independent Telephone Association, Des Moines, Iowa, March* 10-11.

AN AGREEMENT, INCLUDING A CONSTITUTION AND BY-LAWS FOR ORGANIZING A MICHIGAN CLEARING HOUSE.

THIS AGREEMENT, entered into this ..... day of March A. D., ..., by the several parties hereto, WITNESSETH:

That whereas said parties are owners of telephone exchanges, toll lines and systems, which are neither connected with nor controlled by the American Bell Telephone Company, or any of its licensees or sub-companies, and desiring to operate the properties of said companies as one system by placing said several properties under a general head for the purpose of operation and auditing, joint business only, both as a means of economy and effectiveness, it is hereby agreed:

First—That the lines and systems of the several parties hereto shall be immediately so connected together that messages may be transmitted from the lines of the one to the lines of all the other parties to this agreement, thus forming one general system.

Second—That in consideration of the mutual advantages to be derived, said parties hereto do constitute and form the Michigan Traffic Association of Independent telephone companies, composed of the parties to this agreement, which shall be organized and conducted under the Constitution and By-laws hereto attached and made a part of this agreement, and under the Rules and Regulations and Schedule of Tariff Rates which may be adopted by the Traffic Committee of said Association, which said Rules and Regulations and said Schedules of Tariff Rates shall be a part of this agreement.

This agreement shall terminate at the expiration of ..... years from the date of the organization of the Traffic Committee hereinafter provided for.

CONSTITUTION.

ARTICLE I.

SEC. 1. The name of the Association shall be "The Michigan Traffic Association of Independent Telephone Companies."

SEC 2. The object of this Association shall be to promote and regulate interchanged telephone service between the different Independent telephone companies of the State of Michigan.

ARTICLE II.

MEMBERSHIP.

Any person, partnership or corporation, owning or operating telephone exchanges or toll lines in Michigan may become a member of this Association by signing the Traffic agreement, of which this Constitution and By-laws is a part, after making application to the Traffic Committee and receiving said committee's approval.

ARTICLE III.

MEETINGS.

An annual meeting of this Association shall be held on the ..... day of ..... in each year at such place as may be designated by the Traffic Committee, for the election of the Traffic Committee and for the transaction of such other business as may come before it. Special meetings of the Association may be called when deemed necessary by the Traffic Committee.

ARTICLE IV.

OFFICERS.

SEC. 1. The officers of this Association shall be a President Vice-President, Secretary and Treasurer.

SEC. 2. The Traffic Committee herein provided for shall at each annual meeting of the Association elect from its number the officers of this Association, which officers shall be respectively ex-officio the officers of the said committee.

SEC. 3. The executive powers of this Association shall be vested in a committee, to be known and designated as the Traffic Committee, which committee shall be composed as follows: One member from each company signing this agreement, each member being entitled to one vote for each 100 miles, or major fraction thereof, of copper metallic toll line circuits owned and operated by it, and one vote for each 500 telephones or major fraction thereof owned and operated by it.

ARTICLE V.

DUTIES OF OFFICERS.

SEC. 1. The President shall preside at all meetings of the Association.

SEC. 2. The Vice-President shall, in the absence of the President, preside at all meetings of the Association.

SEC. 3. The Secretary shall collect all revenue of the Association and pay the same to the Treasurer, taking his receipt therefor. He shall keep all minutes and keep the proper records of all proceedings of the Association, and shall perform such other duties as usually devolve upon such officer, or that may be prescribed by the by-laws of this Association.

SEC. 4. The Treasurer shall have charge of the funds of the Association as paid to him by the Secretary, and shall pay them out only upon the voucher of the President and Secretary upon order of the Traffic Committee. He shall give a bond conditioned for the proper accounting of all moneys coming into his hands as such Treasurer, and a proper performance of all his official duties. Such bond shall be in such penal sum as the Traffic Committee may fix, and when executed shall be subject to said committee's approval.

SEC. 5. The Traffic Committee shall have full charge of the affairs of the Association when such Association is not in session. They shall have the power, and it is hereby made the duty of this committee to make all the necessary rules and regulations relating to the handling, reporting, accounting and settling of all interchanged business, including the making out of all Association rate and mileage sheets, pursuant to and in conformity with such base rate as may be from time to time determined and agreed upon by this Association, and in all matters shall have such power and shall perform such duties and make such regulations as will secure the carrying into practical effect the general purposes of this Association, and of all such general rules, orders and provisions as may be enacted by this Association or the Traffic Committee pertaining to the toll line tariffs and service over the lines of this Association.

The said committee shall have power to provide and fix rate for toll line service for conversations of less than five minutes' limit, and to make and authorize such modifications or changes in toll rates in special cases as they in their judgment may deem expedient upon application therefor by at least two members of the Association. Said committees shall have power to make and fix the rates for all classes of special service not otherwise provided for.

The said committee shall have power to employ and fix the compensation of such persons in such capacities as the work of the committee and the interests of the Association may in its judgment require.

SEC. 6. The Traffic Committee shall meet from time to time at the call of the chairman, or upon the request of a majority of its members, at such central point as may be agreed upon by them.

ARTICLE VI.

REVENUES.

The revenues of the Association to be used for the purposes indicated shall be obtained by a pro rata assessment upon the gross toll line earnings and commissions to exchanges of the company becoming a member of this Association, or in any way becoming subject to assessment by this Association, and said assessment shall be made by the Traffic Comittee from time to time as may in the judgment of such committee be found necessary. Such assessment may reach, but shall not exceed, ... per cent of the gross toll line earnings and commissions to exchanges in one year of any member of this Association, or any other person or company subject to the assessment herein provided for.

ARTICLE VII.

In case of vacancies occurring among the members of the Traffic Committee, the company from which such vacacancy exists shall fill the vacancy in such manner as it may elect for the unexpired term.

ARTICLE VIII.

SEC. 1. A majority of the members of the Association, duly represented, shall constitute a quorum for the transaction of business; provided, however, that it shall require a majority of all the members of the Association voting in the affirmative to adopt any motion, resolution or take any action, except to adjourn, and, provided, further, that the same person shall not be accredited as the

representative in any way or for any purpose of more than one member of the Association at any regular or special meeting.

SEC. 2. A majority of the members of the Traffic Committee shall constitute a quorum for the transaction of business; provided, however, that it shall require a majority of all the members of said committee, voting in the affirmative, to adopt any motion or resolution, or take other action, except to adjourn.

ARTICLE IX.

AMENDMENTS.

This constitution shall be amended at any regular meeting by an affirmative vote of a majority of all the members of the Association, and at any special meeting of this Association, the object having been stated in the call, upon two-thirds vote of all the members present. The proposed amendment or amendments having first been signed by not less than two members and submitted to the Traffic Committee and filed with the Secretary at least thirty (30) days before said meeting, written notice of such proposed amendment or amendments having been mailed by the Secretary to each member of the Association at least twenty (20) days prior to any such meeting.

BY-LAWS RULES AND REGULATIONS.

1. These By-laws, Rules and Regulations, together with such printed or written orders and directions as may be issued and transmitted to the members of the Association from time to time by the Traffic Committee, shall fix and determine the conditions under which all interchanged business shall be conducted between the exchanges and toll lines in this Association, and with such other exchanges and toll lines as the members hereof may now or hereafter have relations with for the interchange of toll line business.

2. Any company, firm or person, owning or operating any exchange or toll line, connecting with any exchange or toll line of this Association, and interchanging toll line business as provided for in these Rules and Regulations, may, upon application to the Traffic Committee and upon said committee's approval, be given a rating and granted a place in the tables, lists, schedules, etc., of this Association, and shall have the benefit of its co-operation, but subject to the same assessment as members of the Association and all rules relating to the conduct of interchanged business.

3. The exchange or toll line company at whose exchange or toll line stations messages originate, shall have, in addition to its pro rata mileage share of the toll: First, 25 per cent of the toll charged without regard to the point at which said message shall be paid, and the remainder of such toll charge, after deducting such originating commission, shall be divided between the companies over whose lines such message passes in the proportion of the air line distances between junction points and points or origination and destination; provided, however, that in no case shall such originating commission exceed the sum of twelve and one-half (12½) cents; provided, however, that the terminal charges provided for in Section Ten (10) of these rules shall not be subject to the provisions of this rule.

4. Any exchange or toll line company accepting any message for transmission or delivery, and assuming the collections of charges for the same, shall account thereof at the proper settlement.

5. Each members of this Association, originating, transmitting or receiving any message or messages passing over the lines of two or more companies in any month shall check, report, account for and settle out the same in such manner and at such time and in such form as the Traffic Committee may prescribe.

6. The Traffic Committee shall prescribe all forms of blanks used in the checking, reporting and settling of interchanged business.

7. All toll messages for general toll line day service shall be based upon a unit rate of ..... per mile, land air line distance, for ..... minutes service, and each toll charge under this rule shall be fixed at a sum equal to the nearest multiple of five. Any deviation from this rule shall be submitted to the Traffic Committee and be approved by them before taking effect.

8. All toll charges for general toll line service between the hours of 6 p. m. and 6 a. m. shall be as follows: In all cases where the day rate is not less than twenty-five cents nor over forty cents, the rate shall be twenty-five cents; and in all cases where the day rate is over forty cents, the rate shall be sixty per cent of the day rate, estimating the same at the nearest multiple of five.

9. All messages or conversations occupying more time than that upon which the initial rate is based shall be charged for such overtime at the same proportion as the initial rate for each minute or fraction thereof.

10. All toll rates and mileage to and from points not mentioned in the rate sheets of the Association shall be the same as that fixed by the Traffic Committee for the exchange or station in the same county given in the Association rate sheet plus five cents terminal charge, which shall be paid to the terminal company.

11. All switching and junction stations other than at exchange points shall be established, equipped and maintained under the joint control and at the joint expense of the companies, or persons, whose lines are directly connected with such junction or switching station; and all messages terminating or originating at such points shall be held to be the exclusive business of the line over which such business is had.

12. Each exchange or toll line company must arrange for prompt messenger service in the notifying of persons for whom a call has been received and who are not provided with a telephone connected with the exchange or toll station.

13. In no case shall a messenger fee be charged where no messenger service has been actually rendered or where the person called has a telephone connected into the exchange to which the call came. In all other cases a minimum fee of 10 cents may be charged, and such sum shall be the maximum fee within the radius of one mile within any city or to any point in any town or village.

14. The Secretary of the Traffic Committee shall at each annual meeting of the Association make and submit a detailed report of the receipts and expenditures of the committee, showing each item of receipts and expenditures, and accompanying the same with the proper bills, vouchers, etc., and he shall in addition thereto submit a written report of the doings and work of the committee for the year, supplementing the same with such statistical matter as will indicate the growth, condition and extent of the Independent toll line business, interests and property within the territory of the Association.

15. The Treasurer shall at each annual meeting of the Association render a report showing in detail and by items, accompanying the same with the proper vouchers, the receipts and disbursements of the revenues of the Association.

16. The Association shall at each annual meeting appoint a committee of not less than three to audit and examine the financial reports of the Secretary and Treasurer, such committee to be composed of persons not members of the Traffic Committee.

17. All toll tickets or coupons issued and furnished to patrons by any member of this Association shall be accepted in payment of toll charges at any exchange or toll station on the lines operated by the Association, and such coupons shall be redeemed at their face value whenever presented by any member of this Association that has accepted the same in payment for toll line service.

18. All toll tickets or coupons shall be bound in books of such denominations as will meet the requirements of patrons, and each of such books shall have attached thereto or printed thereon a statement of the conditions under which the same is sold, and shall be furnished to patrons at the following rates of discount: In quantities of $5.00, 5 per cent; in quantities of $10.00, 7½ per cent; in quantities of $25.00, 10 per cent; in quantities of $50.00, 15 per cent.

19. In the original construction or renewal of any toll line for through business, or in stringing of additional circuits on existing lines for that purpose, such standards of construction and material and appliances shall be complied with as may from time to time be prescribed by this Association; and all transmitting, signalling and switching instruments, apparatus and devices used in connection with and as a part of any toll line equipment, shall also conform to such standards of the Association as may be prescribed; and in all cases such construction shall be had, such material and apparatus employed as will insure good and satisfactory service.

20. It shall be the duty of the Traffic Committee to fix a rate to be charged for special news service, for newspaper associations, newspaper interests and news bureaus. Such rates to be a schedule of charges for exclusive use of circuit per miles per minute during any specified hour each day, and said committee shall also fix a rate per mile per minute for such service each day where no exclusive use of line is guaranteed at any specified time. Said committee shall also fix an annual rate per mile for the leasing of special circuits.

21. These By-laws may be amended by a majority vote of all the members at any annual or special meeting.—*By R. F. Johnson, of Saginaw, Michigan, before the Michigan Independent Telephone Association at Lansing, Michigan, Feb. 26.*

NECESSITY OF INDEPENDENT TELEPHONE CONNECTION TO DETROIT BUSINESS MEN.

Detroit's wholesale merchants, manufacturers and larger retail dealers are strangely indifferent to the value of connection with the Independent telephone companies of Michigan. Why they are not more active in favoring such connection and making an effort to secure the business that such a large system commands, is incomprehensible. Whether it is a case of Bell hypnotism, a complacent satisfaction in conditions as they are, a disinclination to make further effort to gain trade, or an ignorance of the situation, the result is the same. Detroit is asleep on the telephone situation in Michigan to-day, and congratulates herself that she has but one "bell" to disturb her slumbers. And yet she is not without excuse. Having been "done brown" by a gang of swindlers, it is but natural that she should be a little cautious and conservative.

The Detroit merchant sits in his office, his city is covered with a network of wires that bring almost any person he may want within call. He knows that there are wires radiating from the city in all directions and they bring him business. Detroit is the one stronghold of all that is left of the Bell monopoly in Michigan. Naturally he thinks the Bell must be the whole thing in

the rest of the state. Yet if he will lift his eye, even to the horizon line, he will find Pontiac with more Independent than Bell telephones. He will find Utica, Oxford, Plymouth, Northville and Romeo with Independent companies, but with no Detroit connection. All these almost at his doorstep, and the farther his eye travels, the greater the number of Independent and the fewer the number of Bell telephones, until after crossing a line from Jackson through Howell and thence on to Saginaw and Bay City, the field is practically in the hands of the Independent companies.

Let me illustrate by comparison of the two systems in the territory occupied by the Union Telephone Company. We have exchanges in ten counties in the center of the lower Peninsula extending from Durand to Ionia, and from Lansing to Harrison. In this territory, we are operating thirty exchanges, while the opposition has but six. We have exchanges in twenty-five towns, where the Bell has only toll stations. The Bell has four toll stations not reached by us, while we reach forty-nine towns and toll stations not reached by it. We are operating over three thousand telephones, where it has less than four hundred. In the twenty-five towns where it has no exchanges, we have nearly 1,500 telephones, and in the six towns where each company has an exchange, we have nearly 1,600 to its 300. In our territory we reach 1,300 business places, where it has less than 200. We have 629 miles of toll lines and 126 towns and toll stations.

While we are shut out of Detroit and kept away from the Detroit merchant, we are not cut off from the centers of trade. In fact we reach every other center in the state, as well as Toledo and all important Ohio and Indiana cities, with better service and better equipment than the old line companies. Our company has no bonds and no debts. A large percentage of our subscribers are stockholders and our stock is held by trustees so we cannot be bought out or driven out of business. We have come to stay and we will continue to control the situation in our territory.

We are but a small percentage of the Independent system of the state with its 25,000 to 30,000 telephones, but our situation can be taken as representing the strength of the Independent movement ouside of Detroit in the state.

The Detroit merchant knows that the telephone is invaluable as a means of trade communication. He also knows that he prefers to sit in his office and do his business, rather than go out to a toll station and wait from fifteen minutes to three hours for toll connection. The same is true of the thousands of country merchants who use Independent telephones. He is not compelled to trade with Detroit, though that city may be his natural market. He calls up Toledo, Cleveland, Grand Rapids, Jackson or Saginaw, and gets his emergency order filled without loss of time, and this ease of communication has opened hundreds of accounts that Detroit might have held.

We have been knocking at the door of the Detroit business man for two years. To all intents and purposes he seems unaware of our existence. When public meetings have been called he has allowed a mob of street ruffians to advise the city government, and the city government has acted on the advice. He has signed petitions asking that the Mayor veto ordinances, without any knowledge of the general telephone situation.—*By Stanley E. Parkhill, of Owosso, Mich., before the meeting of the Michigan Independent Telephone Association, held at Lansing, Mich., Feb. 26.*

NIGHT RATE AND THREE MINUTE SERVICE.

There is no branch of telephone work that requires so much study, so much thought, and so much looking after details as toll business. Interchange of business, routing of messages, division of tolls, standardizing of rates, standardizing of apparatus, codes for facilitating the handling of messages, limit of time, night rates, and numerous other problems confront us and have confronted us since the birth of the Independent movement. Some of the problems have been worked out, and others must be worked out in the very near future.

The practice among Bell companies for a good many years was to make a five-minute rate, but until within a comparatively short time the schedule was not insisted on except by the Long Distance Company. With heavily loaded, grounded, iron circuits a subscriber was considered lucky to get his message through in 10 or 15 minutes and "overtime" was rarely charged.

With the advent of copper lines and metallic circuits a closer observance was made of this schedule and the public soon learned that if they talked "overtime" they had to pay for it.

The Independent companies also started with a five minute rate and in some cases they were in about the same condition that the Bell had been in. Subscribers were lucky to get their messages through in any time whatever and no attempt was made to charge for "overtime."

When better lines were built and better service given a closer observance should have been paid to "overtime" charges, but with a few rare exceptions it is not being done.

Now it is proposed to establish a three-minute rate.

What will be the result?

A careful study of the average time consumed with ten, fifteen and twenty-cent messages ("short-distance" messages, they might be called) leads me to believe that it would not be wise to change to a three-minute rate at the present time on messages of this kind.

The average time on "short-distance" messages is about three minutes and ten seconds.

As service is improved and toll lines are used more, the average length of these messages will be shorter and the time limit will take care of itself without any help from telephone companies.

A subscriber using a toll line for ten, fifteen or twenty cents does not feel that he is paying an exorbitant price for service rendered and makes no effort to prolong his message for the sake of getting his money's worth.

He says what is necessary and quits. It may take a minute or three minutes, and occasionally five, but as the habit grows he treats these calls about the same as he does local calls, and in a short time it will be found that the average "short-distance" call will be nearer two minutes than three.

Then why not make the three-minute rate instead of five?

There are several reasons why no change should be made.

As stated before, the average length of these messages is about three minutes now, and will be less, whether the three-minute schedule is established or not.

Our subscribers have been in the habit of talking five minutes at established rates if they wish to. They very seldom talk the full five minutes, but know that they can if they want to.

Now, if we establish a three-minute rate, what happens? Nine times out of ten the subscriber talks less than three minutes, but on the tenth call he talks four or possibly five, and we check him "overtime." He is indignant, and if the "overtime" charge is insisted on he is apt to change from a warm, outspoken and energetic friend to at least a passive and possibly to an active enemy.

There is little to gain and a great deal to lose in a change of this kind, and I would suggest going slow before doing it.

Another thing to be taken into consideration is the effect that this change would have on your country exchange and toll station. The merchant at the village cross roads is anxious to have toll line connections in his store, and, once having it, would hesitate a long while before letting it go, but sometimes he chafes considerably under the collar when he thinks of the trouble and worry that the line causes and the slight financial remuneration he gets for his work.

As a general proposition, the commission allowed is as much as the telephone company can give and make a fair return on the investment, but this does not help your country manager out. He runs a general store, we will say, and sells everything from shoestrings to stoves. While he is taking care of several customers someone comes in to use the telephone. He leaves his customer, gets the connection through and goes back to work. This is bad enough, but if in addition to getting the connection through he is compelled to watch the clock and see whether "overtime" is to be charged he will soon kick over the traces and will either have to be paid a larger commission or he will give up the station.

On messages where the rates are twenty-five cents or over—messages that might be called "long-distance"—a three-minute schedule should be established. It is a question of grave doubt whether long circuits can earn a fair return on the investment at the present rate of one-half cent a mile for a five-minute conversation.

I do not believe it will increase revenues to raise rates. It is more likely to decrease revenues by driving away business, and, such being the case, some other plan must be tried.

The other remedy seems to be a three-minute schedule instead of five. This schedule, once established, will enable us to handle more messages on each line than we are now handling, and the result will be an increase in the revenues of each line. It might be said that the argument does not hold good. That the average length of all messages, like the average length of "short-distance" message, is only about three minutes, and that making a three-minute schedule would not improve conditions whatever.

If the above was correct I would not recommend that a three-minute rate for any kind of a message be established, but it is not. But a very small per cent of the calls from any toll station or exchange are for points where the rates are over twenty cents. The records of the Citizens' Telephone Company show that out of 25,000 toll connections handled during a certain period, 82 per cent were ten, fifteen and twenty-cent messages, 9 per cent twenty-five-cent messages, and the remaining 9 per cent thirty-cent and over.

This shows either that the ordinary telephone user does not have much occasion to call points more than thirty-five or forty miles away or that he hesitates about calling them because the rate is too high, and only does so on matters of importance.

The result is that when he does call he finds out how long he can use the line, and, even though he might be able to transact all of his business in two or three minutes, he will string it out to the limit and get his money's worth. Records will show that where five minutes are allowed for "long-distance" messages that the average is nearer to four or four and one-half minutes than it is to three, as on "short-distance" messages.

I don't believe that a single customer will be driven away or

a message lost by charging to a three-minute rate on "long-distance" messages. The majority of these calls are matters of importance, and the call will be made whether three minutes or five minutes are allowed.

The customer having found that he only has three minutes to talk, will regulate his conversation so that he can get through in proper time, and these calls are such a small percentage of the total business that the few complaints and objections that may arise can be smoothed over and taken care of.

It may be possible to rearrange the present schedule and make a slight reduction to points affected by the change. If this can be done it will more than offset the objections raised to reducing the time limit.

Cheap rates encourage the use of telephones either for local or toll purposes—a subscriber may hesitate to talk once for thirty-five or forty cents and talk three or four times for twenty-five cents—and on that account it would be well to give serious thought toward making a slight reduction in existing rates.

Seventy-two per cent of toll line business is done during the eight hours of each day from 8 to 12 a. m. and from 1 to 5 p. m., and 80 per cent is done between 8 a. m. and 6 p. m.

This means that during fourteen hours out of every twenty-four, toll lines are practically idle, and if anything can be done to increase business during these idle hours it should be done at once.

Some telephone companies have established what they call a "night rate" for the purpose of making this increase, and it seems wise at this juncture for us to decide whether or not we will do the same thing and what kind of messages we shall apply it to.

If by establishing a "night rate" we can increase our revenues and can give to our subscribers a cheaper rate at certain hours than we are now giving, it should be done.

It is doubtful whether it would be good business policy to make a "night rate" on "short-distance" messages. These rates are so low that a subscriber will not be apt to wait until after 6 p. m. because he saves a few cents by so doing, and a cheaper rate on business that will come anyhow at the regular rate would not show good judgment and would simply be throwing money away.

On "long-distance" messages different conditions are found. Subscribers hesitate about using toll lines to points where the rate is 35 and 40 cents or over, and only do so on matters of importance. Now if we can offer some inducements in the way of lower rates to these points our subscribers will use the lines for all kinds of business, important and unimportant, and, having gotten into the telephone habit, will soon use them for social purposes as well.

This low rate can be made operative during those hours of the day that our lines are now idle—from 6 to 8 a. m.

There should be more definite and uniform rules for the handling of toll business. Operators and agents should be told the difference between the right way and the wrong way of putting messages through. They should understand that lines are built for business purposes and not for the convenience of employes; that brevity is a cardinal virtue if not carried too far; that the repeating of what is heard on lines, even to other employes, is not only sufficient cause for dismissal, but an infringement of the law; that courtesy pays in the telephone business as in all other kinds of business. They should be posted on the proper routing of messages. They should know enough to listen in on lines, and not attempt to use them when they are already in use. In fact there are so many things that should be done that are not being done or are being done improperly that a code of rules should be drawn up and sent to every manager and agent in the state.—*By C. E. Tarte, Grand Rapids, Mich., before the Michigan Independent Telephone Association held at Lansing, Mich., Feb. 26.*

RURAL TELEPHONES.

Telephones are to the farmer what steamboats and locomotives are to transportation—a medium through which close relationship is established among the people. The advantages of the rural telephone—who can measure them in their entirety, or fully appreciate the good they bring to the farmers? The rural telephone is only in its infancy, so to speak. When the advantages and conveniences of these telephones are more generally understood, our state will be covered with a system running to every farm house; then we will get down to the real enjoyment of farm life. I am aware that many think that a telephone is a complicated affair, and it needs an expert to run one, but such is not the case. Anyone can run one when it is properly put in.

It putting a telephone in your homes, remember that it is not for business alone. If we wish to keep our boys and girls on the farm to fill our places, we must make home attractive, and a telephone in your home offers the very best inducements for a contented family. You say that the farm life is the most independent life in existence, yet they leave the farm for the cities, though you often see the older generation turn back to rural life with longing hearts. There must be some reason why so many of our boys and girls leave the farm. You will find that the reason is loneliness, the lack of companionship, and other similar causes. Remember that companionship has its practical as well as its sentimental value. Therefore the problem that confronts our fathers and mothers today is to remove that cause of loneliness from their children and themselves. A telephone in our home will bring the comforts of city life to our doors. Can you conceive of the pleasure to be derived from having in your home the means of instant communication with your neighbors, friends and relatives, though situated miles away? I feel that the rural telephone has come to stay and must be considered a necessity, and not a luxury to the rich alone as hitherto.

The experience of the Corwith Rural Telephone Company, which was organized last March and commenced business the first of May, by buying out the Corwith exchange, which then had 38 telephones, is that we now have 191 paying telephones and free connection with over 300, and applications coming every day for more. Speaking from my own experience, after having one in my house for a little over seven months, I would not do without it if it cost me double what it does. The up-to-date farmer needs the telephone in his business just as much as town folks need theirs; if anything, more so, because distances are greater. Have you ever stopped to think how many hours out of every week can be saved for yourself, your family and your teams or hired help by the aid of the telephone—many times saving in one month the cost of your telephone for the whole year.

Have you ever calculated the vital minutes that can be gained in case of sickness or business emergencies? I had to call the doctor to my home one morning a short time ago when the temperature was 12 degrees below zero. It seemed but a few minutes till the doctor drove into the yard, coming two and a half miles. Then again you can keep the doctor posted several times a day just how the patient is getting along, many times saving the expense of the doctor coming out to find out just what you could tell him over the telephone.

All of these things and many more that cannot even be suggested here for want of space, can be secured through the use of the telephone at comparatively insignificant expense. Probably no other single convenience of to-day can be obtained for so small an outlay, as compared with the numerous advantages to be derived. Ask the farmers who have telephones what they think of it. Ten to one they will say with rural telephone and rural mail, the value of their farms have been enhanced from one to five dollars per acre. Ask them which they would rather have, the telephone or the mail, the majority of them will say, "Give me the telephone first."

Brother farmers of Hancock county, take my advice and each and every one of you put in a telephone at the first opportunity, and I dare say none of you will ever regret it. I know some of you will say: I have no use for a telephone, it will never do me any good. But I will guarantee if you will put an instrument in your home and use it a month you will never after do without it. I know of farmers that have talked about putting in telephones, who would say they had no need for one, but the same fellows will go over to their neighbors once or twice a week and say, "Will you be kind enough to let me use your telephone a minute?"

I would like to see in the near future a good system of rural telephones run to every farm house in the country. It is claimed that Iowa is making more progress in rural telephones than any other state in the union.—*By F. J. Oxley, of Hancock county, Iowa, before the Hancock County Farmers' Institute, Garner, Iowa, recently.*

EXCHANGE TELEPHONE RENTS, MEASURED AND SLIDING RATES, AND EXCHANGE COMPENSATION FOR HANDLING THE BUSINESS OF TOLL LINES.

Had I been expressing the idea suggested, as I understand it, I should have said service rates instead of "telephone rents." I do not understand that it is the business of a telephone exchange to *rent* telephones, but to furnish telephone service. If a telephone is rented, then I suppose it might be sub-let, unless there was a special stipulation to the contrary, which I apprehend none of us have provided. When a telephone is rented the renter certainly has cause to assume that he has the right to allow whom he pleases to use it. When we simply agree to furnish a person service to be used in his particular business or by his immediate family, the service is thus properly restricted, and the subscriber has no right to expect the exchange to furnish service to his neighbors, nor to encourage non-subscribers to use it without paying.

The subject of rates is broad, and is easily the vital question of the telephone business, for no matter how substantial and complete the construction, how splendid the service, if the dividends are not commensurate with the capital and labor expended the business is a failure. What would be equitable rates, depends very largely upon local conditions. For instance, for a plant of say 300 instruments in a closely built town, service confined to a small territory, the average line short, and instruments close to central and easily reached for repairs, rates could be lower than for a plant of the same size covering a larger territory. It is also true, that an average plant of 300 can furnish service at a lower rate

than a plant of several times that number. Perhaps an average plant of from 400 to 800, where proper attention is given to toll business, can do fairly well with a flat rate of $1.50 and $3.00, and smaller plants may get along with $1.50 and $2.50; possibly a little less.

But why discuss flat rates? The system is impracticable, unjust and unremunerative. Under it about one-half the people who use the service pay nothing for it, and contribute nothing to the support of the business, leaving this burden to be borne by the subscribers. Paying the entire expense of the business is not the only burden imposed upon the subscribers under the flat rate system. They are annoyed by non-subscribers using instruments in their houses, and suffer inconvenience from unnecessary use of the line by many who would not bother if they had to pay for it.

Under the measured system the exchange is paid for its service, the subscriber gets all he pays for, and if the non-subscriber gets service he must pay. That is all any one can ask. However, I know of no plant that is operated entirely on this ideal plan, though in cities many are served on this basis. The truth is, no ideal device has yet been made for measuring telephone service. The instrument most generally used is the ordinary slot machine. It is simple, is practical, and I think under favorable circumstances might be made fairly satisfactory. The greatest objection to the machine is the time required to give the signal, but this might be largely overcome where an entire system is operated on this plan and people become accustomed to giving the signal under rules that should result in uniform operation. For instance, a plant to be successfully operated upon a measured system, using the ordinary slot machine, would have a machine at every telephone. For the sake of illustration we will suppose the rate to be a penny a call. The subscriber who pays $1.50 a month would be supplied with 150 tokens made of brass and just the size of a penny, bearing the name of the telephone company, and the signature of its executive officer, to avoid counterfeiting. The slot machine would be of the proper size for using pennies. Thus the subscriber supplied with tokens could use them. The non-subscriber could either buy tokens at the exchange office or wherever they might be sold, or could use pennies. Now, suppose the rule of the exchange to be that when central is called and the operator says "number," the party calling should give the signal by dropping either a token or a penny in the slot and immediately give the number desired. If this would become the universal rule people would become accustomed to it, and the performance would require but a moment.

I do not contemplate returning the token or penny, in case the party called is not secured. Some will cry out at once that this would be an outrage, that in cases where parties called are not secured the tokens or pennies must be returned. Is there any reason why an exchange should do all this work for nothing? When we send a messenger for a person, do we refuse to pay the messenger boy because the person sought is out of town or cannot be found? Then why should central connect a person, spend several minutes trying to get the party called for, and failing, return the penny, getting nothing for the trouble? Of course, slot machines are made so that the operator can return the money, but there is no reason why the money should be returned, unless the failure to talk is the fault of central. Numbers called for that are busy could be connected by the calling party waiting until the conversation engaged in is completed, which would usually be only a moment or two. Hence I insist there is no reasonable demand for a device for returning the coin.

As to just what should be charged per call, I am not prepared to say. But it is possible that if we receive a penny a call we would be better off than we are now. Besides, we should require each subscriber to guarantee a certain amount. There could be no wrong in requiring them to guarantee the amount they are paying, because unless something of the kind is done it is only a question of time until they will be compelled to pay more, for there is nothing more certain than that as telephone plants grow in number of instruments operated, the cost of service increases, and it will be necessary to make the plants yield a larger income per instrument. By the measured service system this necessary increase can be secured from those who under the flat rate system pay nothing. Thus we may protect our subscribers from having to bear the entire expense of the service, and further save them from many annoyances and abuses of the service which will be cut out by compelling all to pay who use it.

Since farmers do not make so many calls as are necessary in town, and since their service is over so much greater distances, and therefore more expensive per message, it will probably be necessary to fix different rates for this service. By actual count I find telephones in the country do not make nearly so many calls as are made over instruments in town. But country lines are much longer, and farmers cannot object to paying more per call, especially as they do not require so many calls. The rate adopted should afford them all necessary service at a figure not greater than obtains in town, allowing the frequency of service in town to offset the greater distance of country service.

As to equitable rates to be paid exchanges for handling toll business, a meeting of telephone people held in Moberly recently, adopted the following: "Your committee, appointed to recommend a basis for toll charges, and to suggest equitable switching or terminal charges, beg to report as follows:

"We recommend that the minimum toll charge be 25 cents, and that that charge be made for all messages for distance not more than 25 miles; 25 to 30 miles, 30 cents; 30 to 40 miles, 35 cents; 40 to 50 miles, 40 cents; 50 to 60 miles, 50 cents; 60 to 70 miles, 55 cents; 70 to 100 miles, 60 cents, and ½ cent per mile for additional mileage, distance to be determined by straight lines, regardless of the way the telephone line may run; where a message passes over two systems, the minimum charge to be 30 cents, the fee to be divided between the owners of the lines as nearly as practicable according to the mileage owned by either party, no switching fee to be charged where the message fee is divided, provided that a division shall never amount to less than 15 cents to either party.

"The switching charge in regular local exchanges kept open at all hours, and having a regular exchange business, shall be 5 cents for each message sent or received, this charge to include connection with any and all subscribers' telephones in such telephone exchange, except in towns or at postoffices six miles or more from central; messenger fees to be charged only when necessary, and when actually paid out for messenger service. It is further suggested that where toll lines may have suburban stations where the message charge is necessarily less than 15 cents the switching charge should not be more than 25 per cent of the message fee. Accounts to be rendered monthly and settlements made as nearly the first of each month as practicable, remittance to be made for all messages sent during the preceding month. No switching charge is to be made for a toll message passing through one station or switch from a regular toll station to another regular toll station or exchange; that is, no charge is to be made for through switching, so that the only switching charges will be at the points of origin and final destination. The home office is to make settlement for all stations in its system."

The above report was submitted by a committee of which I was chairman, and was formulated after extended consultation between several managers of toll systems and also of exchanges. Mr. Buffum, president of the Buffum Telephone Co. of Louisiana, Mo., which owns the most extensive Independent toll system in North Missouri, was a member of the committee, and approved the report. As a whole I think the rates indicated fairly equitable under present conditions. I may say, however, that the question is a perplexing one. The truth is, it is difficult to make short toll lines pay the proprietor and also pay switching charges. The message charge is so small that it is hardly sufficient to pay a remunerative switching charge and leave a profit to the line. With an extensive system this is overcome by the larger fees charged for messages over greater distances.—*By J. A. Hudson, Columbia, Iowa, before the Central Missouri Telephone Association at Sedalia, Mo., Feb. 27.*

NEW AND OLD TELEPHONE PROBLEMS.

It is a pleasure, at this time, to address the members of this telephone association in my old home state. Wisconsin was the birthplace of Independent telephony as established to-day. The present era of Independent telephone operation dates back to about 1892, the first successful movement having started in Wisconsin, at Racine. This interest was later removed to Chicago, and ultimately became the decisive factor in successful competition with the Bell Telephone Company and the establishment of Independent telephony, as it exists to-day. The policies and plans adopted in Wisconsin, at the beginning of Independent telephony have been most successful during its history, and are the most popular even at the present time.

This book, which I hold in my hand, entitled "Monopoly vs. Competition," issued by the Wisconsin Bell Company, leads me to tell you of some of the old telephone problems in Wisconsin. It states that its stock was never watered, that every dollar of it represented actual cash paid in, and that during its entire history it has not paid to exceed 6 per cent to 8 per cent per annum. These statements do not accord with the history of that organization.

Shortly after the centennial year, the Bell Telephone Company, of Boston, wrote to Prof. Haskins, who was then superintendent of the North Western Telegraph Company at Milwaukee, tendering him the exclusive agency for the telephone (then almost unknown) in the states of Wisconsin, Minnesota and the Dakotas. Prof. Haskins did not consider the matter of much importance, and replied that he did not have the time to attend to it. He inadvertently mentioned the circumstance to his son, a young man just out of school. After further consultation, the son wrote to the Bell company for sample telephones, which were tendered, and joined with his father in accepting the exclusive agency for Wisconsin, Minnesota and the Dakotas. The result was that the telephones first sent were tried between the Pabst brewery premises and the North Chicago Rolling Mill premises. These were so successful that a little circuit having twelve instruments on one line was established, connecting some of the banks in Milwaukee. At this time a partnership arrangement in Milwaukee was made between the two Haskins, who made no financial investment, and

Mr. Weller, manager of the Milwaukee Telegraph Company, and Mr. Z. G. Simmons, of Kenosha; the two latter putting in $500 each. A small exchange, of the crude grounded line type, was installed in Milwaukee, using thirty-five telephones on a sort of club line system. In the course of a year or two from the time our history begins, some Milwaukee financiers concluded to develop the business with the Haskins. The result was that Mr. Weller was paid $37,500 for his $500 interest, and a few months later, Mr. Simmons was paid $45,000 for his one-quarter interest, represented by $500 invested. Immediately, thereafter, a corporation of a capital stock of $600,000 was formed, of which the Haskins were allowed, for no money investment, a majority of stock, or about $300,000. Following this, a few years later, the Bell company, of Boston, inaugurated its policy of requiring a majority of the capital stock in all licensed companies. The result was an increase in the capital stock of the Wisconsin Telephone Company, sufficient to give this majority as a bonus and subvention for patent rights, etc. I believe the capital stock was increased to $1,400,000 for some such purpose.

During the year or two previous to the formation of the Wisconsin Telephone Company, numerous small exchanges were started in the several cities of Wisconsin and through the influence and investment of local parties Racine, Janesville, La Crosse, Madison, Fond du Lac, Oshkosh, Eau Claire, and several other cities had established telephone systems, under a subagency arrangement with the Haskins. When the Wisconsin Telephone Company was formed, these exchange owners were notified that the new concern wanted the property and proposed to monopolize the business. They tendered them such price for their invested rights and apparatus as this book calls an "old junk price." These exchange owners were arbitrarily forced to sell under threat of withdrawing the telephone instruments, which were leased from year to year, and unfortunately not owned by the local companies.

This book further refers to the changes that have taken place among the Independents in all parts of the country. It cites instances where the Bell company has bought out or closed out competitors. Some of you know how incorrect the printed conclusions are. There is one system in Wisconsin that has been referred to especially, that of the Wisconsin Valley Telephone Company. This book cites Mr. L. S. Tainter, its former owner, as having tried the Independent telephone business, and found it a failure. The facts are, that Mr. Tainter after engaging in the telephone business, and through the death of his father and Mr. Wilson, was compelled to give his entire attention to the tremendous lumber business of Knapp, Stout & Company. He was unable to give the time or attention to the telephone business that it required, and having a good big offer from the Wisconsin Telephone Company for the property, he accepted it. It is particularly interesting to note that this company paid him a special extra bonus of $12,600 to close the contract without delay, besides paying the full value of the property. However, it did not take long for Mr. Tainter to re-engage in the Independent telephone business, and he is now largely interested in Independent telephone exchanges and toll lines in Iowa.

In conclusion, regarding the situation of telephony in the city of Milwaukee, it is a conservative statement made, when I say that fully fifty per cent of the telephones outside of and tributary to Milwaukee are Independent telephones. It is, therefore, high time that this association present in tangible form to the interested people of Milwaukee, plans whereby they may avail themselves of the liberty of Independent telephony.—*By J. E. Keelyn, of Chicago, before the Independent Telephone Association of Wisconsin, Feb.* 10-11.

THE TELEPHONE MANAGER AND HIS SUBSCRIBERS.

BY B. F. WASSON.

The manager of a telephone system has many things to contend with, but we believe all will agree that the inconsistent telephone subscriber is by far the worst among the manager's complex trials and tribulations. Of all the things subscribed for, the telephone is unquestionably the least understood. In our system, which covers fifteen counties and connects with twenty-five thousand telephones, it is not an uncommon occurrence to receive a request for the immediate installation of a telephone in a quarter remote from the exchange, provided access to the entire system is included in the rental at the minimum rate. This request may come from an individual who had been solicited when all things were favorable to giving him service within reasonably short time, but he decides to accept the service at his disposal when the ground is frozen to a depth of fifteen inches and when no poles, wires or instruments are available, and the manager is behind with orders. This particular subscriber-to-be, unless he can be supplied immediately, declares he will not accept service at all, and if he grants an audience with the solicitor may never understand quite clearly why he is required to wait longer than a week, even if he resides twelve miles from the exchange and three miles beyond the subscriber at the end of the circuit.

It is not uncommon for the manager and the troubleman to be notified within the same half hour that a subscriber's telephone has been out of service for three weeks or more, when upon close investigation it can be proven that the instrument had been in almost constant use by the subscriber, or his family, or the entire neighborhood, and that the trouble had not been apparent for more than ten minutes—just long enough for some one of its many users to reach another instrument and make complaint. These conditions prevail everywhere, but probably are excessive in the provincial districts and the smaller villages.

The least trouble usually comes from the subscriber who depends upon his telephone as a purely business requisite. A complaint coming from this source is quite in contrast with the one that is brought in from the home of the neighborhood's gossiping headquarters, demanding repairs instantly, or emphatically ordering that the instrument be removed. The impatient subscriber is invariably the one who selects the party-line service and then imagines that the entire working force of the system lies awake at night plotting to give him the worst of it. As a rule this subscriber's trouble ends with the operator, who has grown accustomed to complaints of a similar kind and who endeavors in her patient way to tolerate a crank.

Fortunately, all subscribers are not alike in this respect, many looking upon the telephone as being the most essential and valuable piece of furniture on the premises. There is also an amusing side to the exchange manager's life that might afford splendid opportunity for the reminiscent story teller. We have had subscribers come into our exchange and ask that a man be sent to charge the batteries in their telephone because the bell refused to ring; while others complained that their telephone refused to work because the ground wire had been broken. In the latter instance the joke becomes apparent when it is ascertained that the line is full metallic circuit. Others are quite sure that their telephone would work if the wire did not come in contact with the limb of a tree easily discerned from the window overlooking the highway, when investigation proves that the line leads in another direction and that the alleged trouble wire has been out of service for at least six months.

It seems to be the concensus of opinion among many that the telephone operator is a bundle of faults, and she it is who is made the target for the nervous man's wrath. Business men who, becoming harassed by the cares of the office, have occasion to use the telephone, and if, perchance, the line wanted is busy, and they are so informed, use the means at hand for hurling epithets upon the already hurried and care-worn operator. Is it any wonder, then, that she will occasionally connect the wrong number, or is a trifle slow, in the minds of the subscriber?

It has been truthfully said that the telephone is the index to a man's disposition, and to a certain extent it lies within the subscriber's power whether the telephone operator's way shall be smooth or strewn with obstacles, along which she must stumble in an uncertain manner, so long as she shall remain in that capacity.

Report has it that in the Lake Superior districts timber for telephone and telegraph wires is rapidly becoming scarce, and that prices are climbing higher accordingly. It is stated that the Pittsburg & Lake Superior Iron Company has closed deals for poles to the value of $150,000, and at materially advanced quotations over last year.

PRESIDENT OF THE STANDARD VITRIFIED CONDUIT COMPANY—R. W. LYLE.

One of the truly busy men of New York is R. W. Lyle, president and manager of the Standard Vitrified Conduit Company. Although a comparatively young man, he has devoted some thirty-five years of his life to the mastery of the practical details of the clay-working industry. He has invented many machines for the manufacture of clay material, and is recognized as having no equal as an expert in the analysis of clay and the practical application of this product to the needs of commerce. Up to the first of last April Mr. Lyle was part owner in a number of large plants that were sold out to what is known as the "clay materials combine." He is distinguished in the trade as having at one time or another been the general manager of several of the big vitrified clay-material concerns.

The Standard Vitrified Conduit Company was organized in July of last year and is perfectly independent in trade. The factories of the company are at South River, N. J., and they are said to be the largest plants in the world for the production of underground conduits. Mr. Lyle's factories, while well equipped for manufacturing other lines of clay material, are reported as having all that they can do to produce underground conduits and insulators, the product of the plant being sold up for the next eight months. Evidence that Lyle is a busy man is apparent from the fact that his concern is supplying all the electrical clay conduits for the Rapid Transit subway and the subway systems of Baltimore and Providence. Mr. Lyle's plants are also turning out the electrical clay conduits for the Manhattan "L," the Metropolitan surface road and the Brooklyn Rapid Transit Railway. Other systems equipped with Lyle's conduits are the Boston Elevated Railway, Philadelphia Rapid Transit, Chicago City Railway and most of the electric-lighting plants in the eastern and southern states.

The insulator invented by Mr. Lyle is in use on the Manhattan Elevated lines and is declared by the operating officials to be giving complete satisfaction.

Mr. Lyle is assisted in the selling department of the Standard Vitrified Conduit Company by Captain B. S. Barnard, who is well known in social and military circles. Captain Barnard is widely recognized in the electrical field as an expert.

In addition to his presidency of the Standard Vitrified Conduit Company, Mr. Lyle is at the head of the National Clay Manufacturing Company and of the Great Eastern Clay Manufacturing Company.

Mr. Lyle is essentially a self-made man. He has worked hard for his success and is not altogether a believer in the adage that "all things come to him who waits." On the contrary, he thinks that the best way to achieve success is to go after it, and come up with the chariot. He was born in Scotland and came to this country when quite young. He began his experience in the clay line in Rochester, leaving that city to connect himself with the Staten Island Terra Cotta Lumber Company. He spent twelve years with that concern, the works of which are at Woodbridge, N. J. The next move he made was to form, along with R. C. Penfield, the Standard Fire-Proofing Company, and the American Vitrified Conduit Company.

He is known among his friends as an athlete, and spends much of his spare time at the New York Athletic Club. He is also musically inclined and derives much pleasure from this art. Mr. Lyle makes his home at the Hotel Imperial.

AND IT RAINED NOT.

One day last week as Weather Observer Pague was sitting at his desk, writing a retraction of the high water prediction of the preceding day, the telephone bell rang. The weather man laid aside his pen, gave his seething brain a moment to cool, and, placing the receiver of the telephone to his ear, observed:

"Hello."

"Hello," said a feminine voice. "Is that Mr. Pague?"

That gentleman, after a moment's hesitation, admitted that it was.

"Well," said the voice, "what is it going to do to-day?"

"That depends, madam, entirely upon the nature and meaning of the antecent of the personal pronoun you have chosen to incorporate in your interrogation, omitting to leave your interlocutor any ground for inference as to its probable definition and bearing on the context," said Mr. Pague, simply.

"I—I did not understand you," faltered the voice in the receiver.

"What do you mean by it?"

"Why, the weather, of course. What is the weather going to do? How stupid in me not to say what I meant before."

"U'm; let me see. We have at present an area of high pressure central off Tatoosh island, which will probably move latterly over Western Washington, Idaho and Dakota. In that event and in case no unforeseen contingency arises a trough of low pressure barometer will be created west of the Cascades, which may result ultimately in precipitation of uncertain duration."

"Wh-what?"

"It may possibly rain before morning. May I make bold to ask why you inquire?"

"Why, you see, it was just this way. I am invited to a party to-night, and mamma said if I wanted to spend some money I have been saving I might buy a pair of blue kid slippers. Of course, you know, Mr. Pague, that it would never do to wear blue kid slippers in the rain, for it would spoil them, you see, and wouldn't look a bit pretty, and that would be perfectly dreadful. So I thought I'd just ask you and if it wasn't, I would get them, for it is a very swell party, and I haven't any party slippers but a pair of ugly old black things and a pair of white ones that are just too dirty to wear on the street even to say nothing of a——"

"My dear young lady," interrupted the listener, "by all means make your purchase. In a case like yours we will arrange for a special dispensation and stand off a few hundred clambering farmers for twenty-four hours, for their thirsty wheat fields are as nothing compared to the importance of a lady of your youth and beauty appearing at an evening party with your dainty feet encased in blue kids. Buy the slippers by all means, but the next time you desire information of this kind kindly telegraph Mr. Willis L. Moore, chief of the weather bureau, for a branch office is hardly capable of arranging such weighty matters as the rainfall. If you are not successful there you might retire to your closet and try your luck with Providence. Oh, no, you are under no obligations whatever. That's what we are here for. Good-bye."

Mr. Pague returned to his desk to complete his retraction, and the young lady presumably bought the slippers, for nothing further was heard from her. As it did not rain that night, the fear that haunted the breast of the weather man all day that he might be presented with a bill for a pair of damaged blue kid slippers has been dissipated, and he can devote his time and attention to the erratic movements of the mighty Columbia.

I have taken TELEPHONY since it started and conclude that it certainly has no competitor.—P. H. Fox, Northport,

Are Country Telephone Lines Profitable

By A. E. DOBBS

Are rural lines a desirable addition to a moderate-sized exchange of from two hundred to one thousand subscribers, and do such lines pay for the extra trouble arising from the increased cost of construction and maintenance that goes with long lines, especially when we consider the low rates which farmers expect to pay for such service?

We must admit that there is much to be said on both sides of the foregoing question, but the matter cannot well be disposed of by reference to the revenue to be derived from a single line or even a group of lines, for looked at from almost any standpoint, the broader view of its effect upon the exchange as a whole must be taken into consideration. Every manager knows of individual lines, which, while they demand more service and cost more to maintain than the revenue derived from them will warrant, yet taken in connection with the rest of the plant, are paying lines for the reason that it is necessary to have them on the list in order to attract other and more desirable subscribers. A grocery store, or express office, for example, does not, as a rule, pay even half the cost of the service furnished. Six hundred calls a month is a low average for this class of business and many a manager would be glad to make an arrangement whereby he might receive half a cent a call from such lines, but very few patrons would be obtained by a telephone exchange that did not have such connections.

So we find the rural line proposition: The more outside connections the exchange has the more necessary it is to the town residents, for nearly all have country relatives with whom they wish to communicate, or if not they find it necessary to do more or less business with country people, so that in towns where there is lively opposition the exchange that secures connection with nearly all the farmers in the surrounding country holds the key to the situation.

In some respects, it must be admitted, rural business is rather unsatisfactory.

First objection: Single line service on account of its greater distances would necessarily cost from three to four times more in the country than the rates obtained from town residents, but with from six to ten parties on one line it is possible to make this class of subscribers an even lower rate than that charged town patrons. But party lines at the best can be regarded as a necessary evil, justified only by the low rates which farmers are able or willing to pay.

Second objection: Bridging lines require an increased outlay of from $3 to $4 for each instrument installed, while the length of the line makes their maintenance expensive in direct proportion to the distance from the office; or, in other words, a line ten miles long costs about ten times as much for repairs as one only one mile long, provided the same class of construction is followed in both cases.

Third objection: Farmers as a class are new to the methods of telephoning, and therefore troublesome customers to handle, and are apt to have an exaggerated idea of their own rights and underestimate the rights of others. Even in towns, where people by experience have to a great extent learned social and business amenities, there is apt to be considerable friction where party lines are installed, even though the number rarely exceeds four or five on one line. Moreover, townspeople have learned to cut their conversations short and have no hesitation in saying "good bye" when they have nothing more to say, but our buccolic friends seem to think it discourteous to be the first to break away, and, like a callow youth parting from his sweetheart at the door, they make their good byes last as long as the call. Imagine, then, this state of affairs on a line to which from ten to twenty subscribers are connected.

Fourth objection: Added to the above the isolation of farm houses tends to develop the bump of curiosity, and thus the temptation to the farmer or some of his family to listen to what other people are saying is almost irresistible, which, of course, not only exhausts the local battery, thus imposing upon the inspector frequent trips over the road, but, worse than all, if the party called does not answer the first ring it is almost impossible to call him again until everyone has hung up his receiver. The difficulty of getting parties to answer calls on a line of this kind is great enough even when there is no eavesdropping, but when half the receivers on the line come off their hooks every time the bell rings it imposes a great deal of extra work and worry upon the operator who receives all the blame for poor service.

Fifth objection: Owing to the fact that many owners of telephone exchanges do not possess the means to thoroughly cover all the surrounding territory, they frequently have to arrange with the farmers to furnish their own poles and a great deal of the labor of putting up the line with the result that the poles will be undersized and not properly set, and within a short time the line becomes an expensive appendage to the exchange as well as an eyesore to the public while the reputation of the whole plant suffers in consequence of the poor service of a few outside lines.

Sixth objection: This is really a continuation of the fifth subdivision, but is slightly different, in that many farmers seek to build their own lines on the mutual assessment plan, charging a rate that can only be applied to cheaply constructed lines and cheap instruments and insist on exchanging service with the town exchanges. When this is refused, they sometimes go to the length of even building branch offices in the town to connect with their own lines. This is really a serious question with some managers, who often find themselves confronted with the choice of either making connections to an inferior line to their own injury and loss of prestige, or meeting competition on their own ground. The only way to meet a case of this kind is to insist on good, serviceable construction and equipment and sternly refuse connection until they are in a condition to give as well as receive like service, even though it requires a great deal of courage on the part of the owner to do this. If they think they can establish a branch exchange in town and make a success of it let them try it. Farmers after a short trial of running a poorly equipped exchange will see that their lines are not in proper condition and will demand better service. Poor telephones and cheap equipment are not unlike other cheap products that offer a means of education towards something better. After a short experiment it is comparatively easy to make equitable terms for better equipment. As before stated, connections with the surrounding country is most advantageous to an exchange, for many people who could not ordinarily be persuaded to subscribe to telephone service will do so without solicitation when their neighbors and friends have done so.

Aside from the desirability of increasing the size and influence of the exchange, the rural community can be educated into very desirable subscribers with a little work either in person or by means of printed matter judiciously distributed at intervals. Farmers are not any more unreasonable than other people and the surest way to educate them is to take them into your confidence and make plain the

reason why certain practices and methods create poor service and interfere with the usefulness of lines.

Having learned the usefulness of the telephone, the manager who has not enterprise enough to cover his own territory will, sooner or later, find that someone else has undertaken the work for him and will control business that he should have controlled and be in position to dictate terms instead of asking for them. Much as rivalry between Independent telephone companies in the same territory is to be deplored, the manager who by his own inertness has allowed this to happen is not greatly to be pitied. In some instances exchange owners invite competition by their own loose methods of construction and operation, but we are glad to note that this class is being eliminated either by education or absorption, into more vigorous companies.

On the supposition that the town exchange is well constructed and well managed, it follows that its country lines will also be well constructed and well managed under which circumstances farmers will make arrangements with the exchange rather than try to build their own lines, for there is very little talk of competition where service is good.

Before taking up the objections to this class of service in the order in which they are named, let us begin by quoting that old saying, "the best is always the cheapest." The best is none too good for telephone service, for the very best there is lacks some elements of being perfect.

Where not more than half a dozen telephones are concerned, a wire laid on the ground will often give a talking service which by dint of shouting and much repetition can be understood, but that cannot be called good service or a good line, and would probably fail altogether. In no business is the old saying, "a chain is no stronger than its weakest link" more applicable than in telephone service.

Taking up the above objections in their order, we may begin as follows:

First: The maintenance expense of country lines can be greatly reduced by proper construction. There is often a disposition to slight work of this kind because the line will, it is thought, never carry more than one or two wires of small size, and therefore any pole is good enough for a farmer's line; so that we find poles with four inch tops and six inch butts set three and a half feet in the ground, where they should be set at least a foot deeper; in some cases No. 14 wire attached to porcelain knobs, where glass insulators ought to be; corners made without guys and construction work slighted to such an extent that the line falls down of its own weight in a year or two and is a constant source of expense and unsatisfactory service as long as it lasts.

If, on the other hand, the line is laid out as though intended for a permanent investment, then no pole should be selected that measures less than six inch top and with butt in proportion; gained for two cross arms at least, and set fifty-four inches in the ground, and every angle firmly guyed, there will be no giving way when the wires are pulled up tight as they should be. If the line does not carry wires enough to justify the use of cross arms, brackets carrying glass insulators may be used for the time being, but if more than two wires are to be carried, then cross arms should in all cases be placed on the poles and ten pin arms at that, held in place by means of braces, so that when future extensions or additional wires are strung, as they are sure to be where that class of construction is followed, the arms will not have to be taken off and replaced by others.

This style of construction will cost about twice as much as the bean pole style, but it will last about four times as long and will not require the services of a troubleman every time the wind blows a little harder than usual. While we are on this subject it might well be remarked that poles placed two hundred or more feet apart will not permit of the wires being pulled tight enough to maintain the strain, and that such a line will be apt to have a great deal of trouble with crossed wires, while with poles one hundred and thirty-two feet apart forty to the mile, there is no trouble in pulling wires so tight that they cannot cross and the only repairs such a line will need will be a general repair trip about once a year to overhaul corner guys, replace a few broken insulators and trim trees. Short spans will also stand wind, snow and sleet storms much better than long ones. To illustrate:

A span of wire two hundred feet long will require a strain of one hundred and fifty-five pounds to draw it tight enough so that there will not be more than one foot sag, and it must be admitted that to keep wires tight enough to prevent crossing the sag between poles should not exceed twelve inches. A dip of twelve inches between poles one hundred and thirty-two feet apart would not require a strain of more than seventy pounds, a clear gain of eighty-five pounds, which will greatly relieve the strain on corners or permit the line to be drawn up to an eight-inch dip, as it should be, and even then there would be about sixty pounds to spare, an important consideration in a sleet storm.

Several years ago the telegraph companies whose wires are spread from eighteen to twenty-four inches apart, and with rarely more than a dozen on one line, adopted thirty poles to the mile as their standard, and some telephone companies, taking no cognizance of the lighter wires and closer spacing of their lines, adopted the same standard distance, taking no note of the fact that where telegraph lines are numerous and copper wire is used, they increase the number of poles to forty and in some cases even fifty to the mile. The standard number of poles used by long distance telephone companies is forty to the mile, and the small amount of line trouble experienced by these companies whose wires cover thousands of miles of territory, recommends this as good practice. The cost of such a line with cross arms and guys in place will be a little more that of a bean pole line, being about as follows:

Forty poles at $1.25 each	$50.00
Forty holes at 15c. each	6.00
Cross arms (10 pin) and braces, at 50c. each	20.00
Erecting poles, hauling, etc., 30c each	12.00
Total	$88.00

These prices will vary somewhat, depending on the prices of poles and labor, but they correspond very closely to figures obtained at various points in the middle west.

The cost of stringing the wire must also be added to the above, which will also vary according to the number of wires strung at one time, as it does not cost a great deal more to hang six or ten wires at once than one, the wire itself being a constant quantity. A cheaper construction than the above would probably save one-third of the above estimate, but as every trip of the inspector over the road costs from $2.00 to $6.00, it would not take a great many trips to make up the difference saved by inferior construction, to say nothing of the annoyance to patrons by interruption of service. Moreover, a well-constructed line and good continuous service is the best known solicitor, and a line of this kind will soon be connected to at least three-fourths of the houses it passes.

(To be continued.)

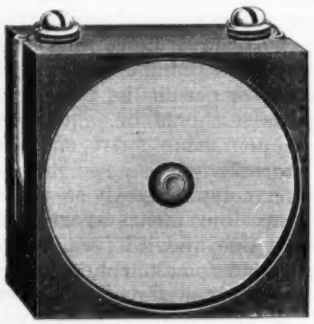
Mrs. Emily Warren Roebling, wife of Washington R. Roebling, died at her home in Trenton, N. J., February 28. It was she who, upon the disabling of her husband, took upon herself the difficult task of supplementing his work in the construction of the Brooklyn bridge. Mrs. Roebling was very widely known and a prominent club woman.

Major Frederick Luther Holmes died February 26, 1903, at his residence, 172 Lafayette avenue, Passaic, N. J. Major Holmes was assistant superintendent of the Okonite Company.

MANUFACTURERS' SECTION

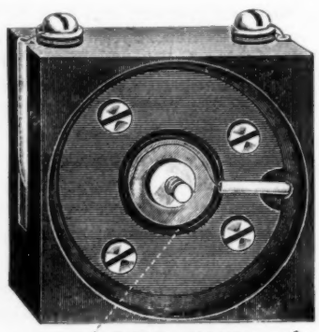
THE BUTTON TYPE TELEPHONE TRANSMITTER.

We illustrate herewith a new type of telephone transmitter, made by the Fahnestock Transmitter Co., 74 Cortlandt street, New York, which in appearance and construction presents quite an innovation and departs radically from the solid back which seems so far to have held the field as the correct principle for all transmitter construction. This instrument is known as the "button" type transmitter and derives its name from the button, a cut of which we show full size.

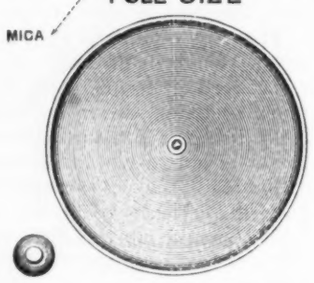


FULL SIZE

This button is entirely self-contained and is in itself a very efficient transmitter if placed on a table and spoken to. It carries within itself two sound diaphragms, a carbon chamber and two electrodes, and is designed to slip into the sound chamber carried at the end of the pivoted arm. Two cords are carried up through the inside of the arm to make the necessary electric connection.



FULL SIZE

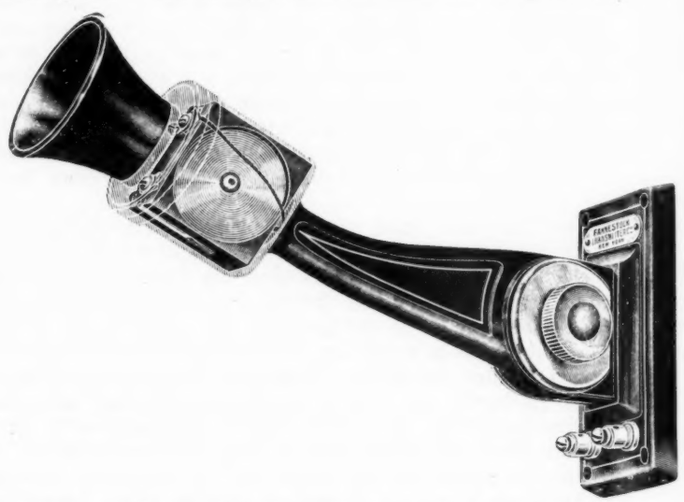


The button is not a permanent part of the sound chamber and may be removed and replaced by a new one at any time by removing the face plate and loosening the cord connections. In its construction the button consists of a carbon chamber and two vibratable electrodes carried by mica washers. These washers are clamped by steel rings to opposite sides of the carbon chamber, effectually sealing the same and making it moisture proof. Each electrode has clamped to it a sound diaphragm, which diaphragm has no other support. This allows freedom for the periphery to vibrate and insures the tuning of the two diaphragms to the same characteristic note. It also permits of a perfect and permanent adjustment of the electrodes, inasmuch as the support of the carbon chamber and electrodes cannot be at variance with the support of the diaphragm, as is often the case with instruments of the solid back type. Means are taken to flexibly connect the periphery of the sound diaphragm to the button after it has been clamped in place on the electrode. This flexible connection prevents the sound waves from impinging on its under side.

It is claimed that this method of supporting the sound diaphragm not only gives greater tone volume, but clearer and sharper articulation. It is for this reason that the size of the diaphragms may be so materially reduced from standard, as shown in the cut, and the volume of tone produced still be above that ordinarily obtained with solid back instruments. When the button is in place within the sound chamber the surface of the diaphragms is transverse to the line of progress of the sound waves and the button presents

CENTRAL ENERGY TRANSMITTER, WITH BUTTON READY TO SLIP INTO SOUND CHAMBER.

to the opening at the mouthpiece only its edge. This effectually prevents any mechanical injury being done it and removes the necessity of having a protective bottom to the mouthpiece. The sound waves on entering the mouthpiece

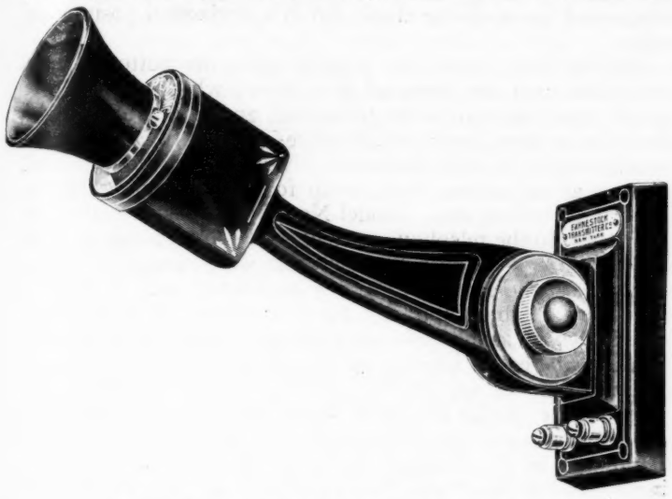


PHANTOM CUT SHOWING BUTTON IN PLACE OF SOUND CHAMBER.

are divided by the edge of the button, and then impinging on the beveled sides of the sound chamber are deflected against the diaphragms.

The instrument is constructed throughout of a special hard non-corrosive alloy. Each part is cast in a brass mold, which insures accuracy and interchangeability of all parts, while the non-corrosive feature of the alloy entirely eliminates all possibility of corrosion by the moisture from the

breath. The finish is entirely of black enamel, which would seem to insure a greater durability of finish than is ordinarily

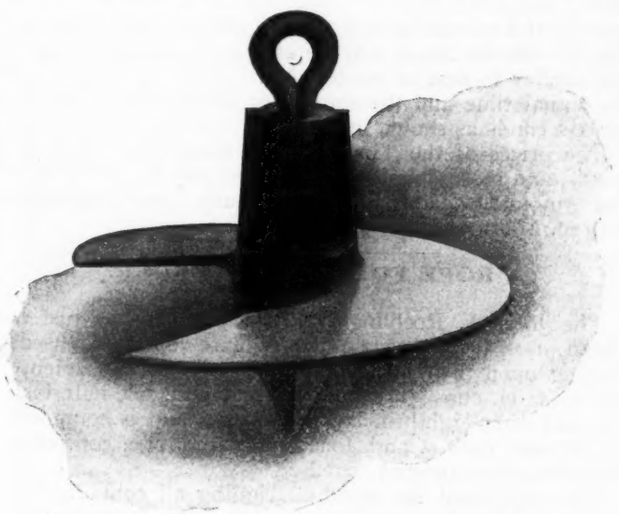


CENTRAL ENERGY TRANSMITTER COMPLETE.

obtained by those instruments having extensive nickel-plated parts.

A NEW GUY ANCHOR.

As the construction season opens our readers are naturally looking for the best device for each purpose. In reply to recent requests for information in regard to improvements of their's W. N. Matthews & Bro. of St. Louis write that they expect in a short time to place on the market a new style rodless Stombaugh guy anchor. The trouble heretofore has been that the rodless anchor was made entirely of cast iron. This made the eye very weak and a constant source of annoyance. The improvement is a forged eye, as shown in figure herewith. It will be noticed the shank of the dropped forged eye is so notched that it can neither turn in or pull out of the casting. This affords not



IMPROVED STOMBAUGH GUY ANCHOR.

only a cheap and durable anchorage, but a means of using up scrap and short pieces of strand. The strand can be placed in the eye of the anchor and the other end looped so that the guy wire can be attached at pleasure.

The illustration in the advertisement of this company in this issue of TELEPHONY, shows in a graphic way the workings of this device. The dotted spiral line indicates the course of the anchor as it works its way into the earth without disturbing same, while the cone shown by the drawing represents the conical section in which the lines of force operate when the strain of the guy wire is made.

To the casual observer it would appear that the holding power would be represented by a six-inch hole dug in the ground, filled and tamped after the anchor is placed, but this is readily shown to be erroneous by studying the cut.

The Stombaugh guy anchors have stood the test of time, having been in successful use for a number of years. They need only be placed deep enough to go below the frost line to last indefinitely. They combine the good qualities of cheapness, durability and quickness of installation.

PROTECTION OF TELEPHONES AGAINST LIGHTNING.

If the device, illustration of which we show herewith, has all the protective features its manufacturer claims for it it is worthy of universal adoption. It is called the Tornquist combined lightning arrester, ground switch, fuse and lever cut-out, and is now being manufactured by the J. A. Tornquist Manufacturing Company, Buda, Ill. Among other things the manufacturer has to say of it is that it is so arranged as to entirely disconnect the line from the instrument, keeping the lightning arrester performing its part, saves the fuse and at the same time does not interfere with the working of other instruments on the same line, thus giving protection from lightning and lessening the chance of property being destroyed by this element. The operation of this device, briefly stated by the manufacturer, is as follows: On the approach of a thunder storm throw switch lever open, which entirely disconnects the line from the instrument. When the switch lever is thus opened injury to the cut-out or instrument is absolutely prevented. If a series line, the plug should be placed in lower opening or the circuit will not be included, as is apparent. To cut out either side of circuit on a series line place the plug in opening at right or left, according to which side you wish to cut out.

If you forget to throw lever open in case of a storm you have good protection, as you have the carbon arrester, the metallic arrester and the fuse, making three protectors. Line wires are connected to outside posts, ground wire to middle post. Wires to the instrument are connected to the two lower posts. Middle post on top can be used to connect a line to which you may wish to connect and disconnect at different times. This device is carried in stock and sold by all prominent jobbers.

March 20, 1903, was the twentieth anniversary of the opening of telephone communication between New York city and Cleveland.

THE TIMEMOMETER, OR CALCULATING AUTOMATIC TIME STAMP—FOR TELEPHONE SWITCHBOARDS, ETC.

No argument is necessary to prove the advantages gained by the employment of an accurate automatic time recording and calculating machine in connection with the operation of telephone toll lines. A new invention for this purpose, called the Timemometer, is being put upon the market by the Automatic Time Stamp Co. of 160 Congress street, Boston, Mass., this company being the originator and first maker of automatic time printing machines, especially of the kind in which a miniature time dial and hands are printed, and which has had its greatest development in the well-known "automatic time stamp" in extensive use all over the world.

The Timemometer is the invention of Mr. John C. Wilson of Boston, Mass., and is an adaptation of the automatic time stamp, to print the exact, hour, minute, quarter minute

FIG. 1.

FIG. 2.

or second, A. M. or P. M., and the date when a toll line conversation begins and when it ends, and to calculate and print the elapsed or intervening time to a quarter of a minute, or to the exact second as required.

The Timemometer is made in three forms, known as model No. 1, model No. 2 and model No. 3, as shown. Models No. 1 and No. 2 may be fitted with either wheel or type

FIG. 3.

dating devices, while model No. 3 is restricted to the use of the latter. In model No. 1, the time is not visible, while models No. 2 and No. 3 are provided with visible clock dials and with hands which move in unison with the time printing hands, these machines thus serving both as time pieces and stamps. Model No. 2, although generally similar to model No. 1, is larger and has its visible clock dial placed perpendicularly in front, while model No. 3 is rectangular in shape and has a visible clock dial in a horizontal position on top.

Models No. 1 and No. 2 print upon the bottom of the toll-ticket, and are operated by a blow; while model No. 3 prints upon the top of the toll-ticket, and is operated noiselessly by a press lever, which moves the ink ribbon forward automatically at each operation. Either model may be used also as an automatic time stamp for time-stamping letters, telegrams, orders, etc. Model No. 3 is especially adapted to be fitted into the telephone switchboard shelf, so that its base will be on a level with the shelf, the operating lever being underneath the same; or, it may be placed upon a pedestal or other suitable support. Its ink ribbon is twenty-four feet in length, and feeds automatically, and a new ink ribbon may be easily inserted at any time.

The machines are all very strongly made and finely finished. The clocks are good time-keepers, are enclosed in dust-proof cases, especially model No. 3, and are not interfered with in the slightest degree by the operation of printing. Models No. 1 and No. 2 do not print seconds, but are arranged to print the actual time and the elapsed time to a

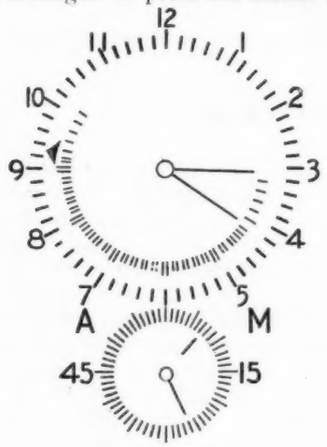


FIG. 4.

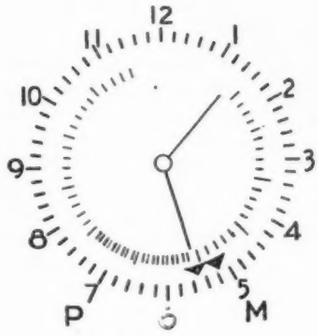


FIG. 5.

quarter of a minute upon a toll line slip or ticket as shown in Fig. 1. Model No. 3 may be arranged to print a time record similar to that of models No. 1 and No. 2, or to print the actual time and the elapsed or intervening time to the exact seconds as shown in Fig. 2.

The prices of the Timemometer range from $35.00 upwards, and more detailed information may be obtained from the Automatic Time Stamp Company, 160 Congress st., Boston, Mass.

ROPE FOR CUP DEFENDER.

The John A. Roebling's Sons' Company has just completed an order for 24,000 feet of wire rope to be used for rigging upon the yacht now being built for the defense of the America cup. The rope ranges from one-half inch to one and three-eighth inches in diameter and is composed of six strands, each strand, for most of the rope, consisting of nineteen wires twisted together.

The rope used for standing rigging all contains a wire center, while the running rope has the strands twisted around a hemp center in order to give perfect pliability. The large sail area of the new boat will bring a very severe stress upon the rigging, and the failure of any part of it during a race would, of course, mean the loss of the contest.

In order to prevent this condition the specifications under which the rigging for the new yacht was made required that pieces of all the different ropes should be tested before

making shipment, and show a strength varying from 4½ tons for the smallest to 94 tons for the largest diameters.

To obtain this strength the highest grade of steel which could be obtained for the purpose was used in drawing the wires. These wires were tested before stranding and the tensile strength of the greater part was found to be over 300,000 pounds per square inch, while the finished rope developed in the breaking tests a strength from 15 to 20 per cent higher than that called for in the specifications. The rigging will be exposed to the elements and in order to prevent weakening by rust has been heavily galvanized.

KANSAS CITY CONTRACT AWARDED TO THE STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY.

No doubt, many telephone men, especially in the territory surrounding Kansas City, will be pleased to learn that the contract for the central office equipment for the Home Telephone Company, Kansas City, Missouri, and Kansas City, Kansas, has been awarded to the Stromberg-Carlson Telephone Manufacturing Company of Rochester, New York and Chicago, Illinois.

The contract comprises four exchanges as follows: The main exchange having a capacity for 12,000 lines will be equipped for the immediate operation of 4,500 lines, capacity for 360 trunk lines, present equipment of 120 lines. The East branch exchange will have an ultimate capacity of 7,200 lines, equipped for the immediate operations of 1,200 lines, capacity for 360 trunk lines and a present equipment of 75 lines. The South branch exchange will have a capacity for 7,200 lines and a present equipment of 700 lines, capacity for 360 trunk lines with a present equipment of 75 lines.

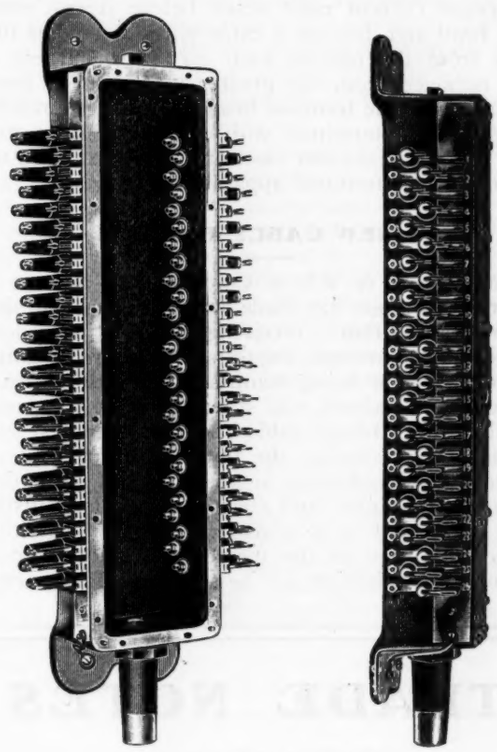
The Kansas City, Kansas, exchange will have a capacity for 7,200 lines and will have a present equipment of 800 lines, capacity for 360 trunk lines and a present equipment of 80. All of the above boards are to be of the Bridged Multiple Relay Lamp Signal Central Energy type. The contract also calls for the necessary wire chief's, monitor's and chief operator's desks, distributing frames, lightning arresters, power plant, storage batteries and a complete central office equipment. The main exchange is to be in operation on September 20th and the sub-exchanges October 1st, 15th and November 1st, 1903.

This is probably one of the most important contracts, as well as the largest, that has been awarded for a considerable time. It is stated that the company has been for some months purchasing this equipment, during which time they have made a most thorough and rigid investigation of the telephone apparatus manufactured by the leading telephone companies.

MOON FUSE TERMINAL WITH CARBON ARRESTOR.

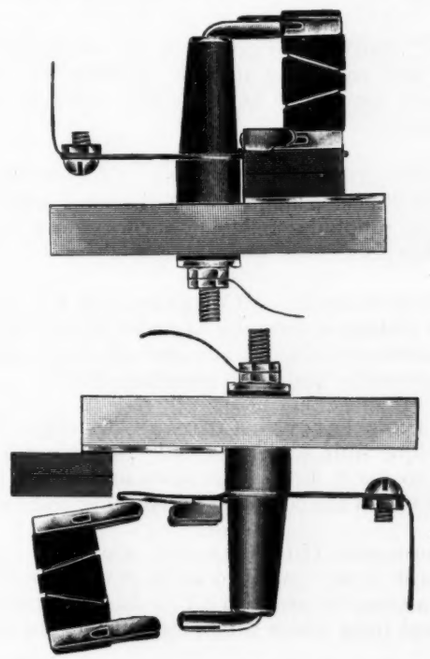
The efficiency of the Moon terminal head for telephone cables has been well tested, and the apparatus has gained a wide reputation since the demand for cable protection by the pioneer Independent telephone exchanges. Owing to the increased number of trolley and electric light lines, together with the extensive growth of the telephone industry, there is a demand for apparatus that will not only protect the cable wires from currents of heavy voltage, but which will direct these currents to the ground without injury to the terminal apparatus itself.

To accomplish this purpose, the Moon Manufacturing Company, Chicago, is making a fuse terminal head having carbon arresters, and embodying all the features of the first apparatus, which made it a complete protection to the telephone cable. The accompanying illustrations show this new apparatus. The lower carbons rest upon a heavy copper strip, to which a grounded wire is attached. The two carbons are separated by a thin sheet of perforated mica. Lightning, electric light or trolley currents will cut out the



MOON TERMINAL HEADS.

fuse and pass through the two carbons to the ground without forming an arc of sufficient heat to injure the insulations of the terminal connections. The apparatus has been thor-



DETAIL OF CARBON ARRESTER, SHOWING ADJUSTMENT OF FUSE AND CARBONS.

oughly tested and will withstand a current of very heavy voltage. It will be noticed that the fuse, the carbons and the line connection are all supported by a single insulated carbon post, which is locked into the terminal head by nuts

and washers. This makes a compact and substantial form of construction, occupying very little space. This apparatus has one feature exclusively its own in that the point the high-potential current must reach before it can enter the terminal head and damage a cable wire, is a point furthest removed from the natural path of such current, being furthest removed from the greater attraction of the large body of metal of the terminal head, with its grounded wire.

The Moon fuse terminals with carbon arresters, together with the Moon metal outer case, or storm box, seem to constitute an efficient terminal apparatus.

A NEW CABLE HANGER.

The Macomber & Whyte Company, 19 and 21 South Canal street, Chicago, has made an improvement in the Chicago cable hanger that is receiving the attention it deserves. After receiving numerous requests relative to a change, the cable hanger is now being manufactured with marlin hangers, which, it is claimed, add strength to the company's assertion that "the Chicago cable hanger is the latest and best on the market." Among the things that are claimed for it are ease of attachment, impossibility of becoming detached, indestructibility and cheapness. It is adjustable to any size cable and is so constructed that it cannot come loose from or slip on the messenger cable. Terms and printed matter explaining will be sent to those interested.

TRADE NOTES

THE STROMBERG-CARLSON MANUFACTURING COMPANY, Rochester, N. Y., has increased the capital stock of the company from $3,000,000 to $4,500,000, shares to be par value of $100 each.

THE H. C. ROBERTS ELECTRIC SUPPLY COMPANY, Philadelphia, is now equipping its new building for occupancy. This company expects to be in its new quarters within the next sixty days.

THE INDEPENDENT TELEPHONE CONSTRUCTION CO., Metropolitan Block, Lima, Ohio, will secure more subscribbers for you, supplying reliable solicitors on a commission basis. References, Metropolitan Bank.

THE VALENTINE-CLARK COMPANY, 234 La Salle street, Chicago, is making a specialty of cedar telephone poles and wishes to announce that at any and all times can fill any size order promptly and from seasoned timber.

THE ILLINOIS ELECTRIC COMPANY, Chicago, has issued a rather unique little folder entitled "Come Inside." Space is devoted to the I. E. S. ohmmeter and the I. E. S. pole changer, of which the company is reporting large sales.

THE DOUBLEDAY-HILL ELECTRIC COMPANY, Pittsburg, advises that it is now installed in its new eight-story building, where a complete stock of all kinds of electrical supplies is carried and from which prompt shipments are assured.

THE FARR TELEPHONE & CONSTRUCTION SUPPLY COMPANY, Chicago, is offering to the trade its new catalogue No. 16. It contains 500 illustrations pertaining to telephones and is furnished free to any who may write for it.

THE MAGNET WIRE COMPANY, New York, is moving its factory from Newark, N. J., to 104 and 110 East 129th street, New York. The company's office is now located in larger quarters in the John Wolff building, 80 William street.

THE ILLINOIS ELECTRICAL COMPANY, Chicago, is now sending to the trade a very handy duplicate order book for the convenience of those ordering electrical goods of this company. Circulars illustrating and describing the "Peirce" construction specialties are also inclosed.

THE CALCULAGRAPH COMPANY, New York, is publishing the result of experiments with the calculagraph. It is claimed results obtained from its use by a telephone company were so gratifying that it immediately purchased one hundred and thirty-eight of the machines.

THE W. J. BARR MANUFACTURING COMPANY, Cleveland, Ohio, has been incorporated with a capital stock of $10,000. W. J. Barr is president and treasurer and Thomas E. Barr, general manager. It is the purpose of the company, as in the past to manufacture transmitter arms, exclusively.

THE B. R. ELECTRIC COMPANY, Atlanta, Ga., has amended its articles of association that its business may be extended to include the manufacture of telephones and all electrical and telephone appliances. The capital stock of the company has been increased from $40,000 to $80,000.

THE STANDARD TELEPHONE & ELECTRIC CO., Madison, Wis., is enjoying a patronage right now that is claimed to exceed any other in the career of the organization. The success is due in all probability to the company's adherence to the maxim, "A satisfied customer is the best advertisement."

THE MCDERMID MANUFACTURING CO., Chicago, makes the announcement in this issue of TELEPHONY that its newest switchboard cord, known as Premier B. B., is "The cord that won't wear out." This ought to interest every reader of this publication in finding out more about a cord, the manufacturers of which make so broad a statement.

THE EUREKA ELECTRIC COMPANY, 143 South Clinton street, Chicago, is issuing its latest bulletin in the interests of the Eureka non-infringing, solid-back transmitter. The bulletin describes the apparatus and shows illustrations of the front and back of transmitter and of the transmitter plunger, and will be sent to any one writing for such information.

THE ELECTRIC APPLIANCE COMPANY, Chicago, wishes to inform its patrons that it is now in position to make prompt shipments from a well-assorted stock of circular loom ranging in size from one-quarter to two and one-quarter inches inside diameter. This company is issuing a new transformer catalogue describing the new Packard vacuum process of transformer insulation.

THE JOHN A. ROEBLING'S SONS COMPANY, Trenton, N. J., has recently completed an order for 24,000 feet of wire rope. It ranges from one-half inch to one and three-eighths inches in diameter and is composed of six strands, each strand consisting of nineteen wires twisted together. The rope will be used for rigging up the yacht now being built for the defense of the American cup.

THE SWEDISH-AMERICAN TELEPHONE COMPANY has leased the eight-story building at 88-90-92 West Jackson boulevard, Chicago, and will remove to that location on or about May 1. The new location is but four doors farther west and on the opposite side of the street from the company's present quarters. The new building affords fine ac-

commodations and will be equipped throughout with the very latest machinery.

THE EUREKA ELECTRIC COMPANY, Chicago, after advertising its non-packing and moisture proof transmitter, is receiving a large number of inquiries concerning it, and a number of very interesting experiments conducted show that the apparatus is of meritorious award. A manager of an Arkansas telephone company states that after filling one of these transmitters with water he was still able to talk over a long distance line as satisfactorily as before.

THE SUMTER TELEPHONE MANUFACTURING COMPANY, Sumter, S. C., is now advertising its complete line of exchange equipment. Special stress is placed upon the "Sumterfone" and "New Beauty" styles of telephones, along with the "Bulls-Eye" combined drop and jack, with patented inwardly falling, self-restoring shutter. On account of fast increasing business the company is now erecting new buildings, which will nearly double the present capacity.

THE CENTRAL ELECTRIC COMPANY of Chicago has just placed on the market a new telephone bracket made to attach to the side of a desk, so that a desk set may be swung out of the way when not in use. This bracket has a double swing joint and an adjustable clamp, whereby it may be made to fit the base of any telephone. It is finished in oxidixed copper and is being sold by the above company at $1.00 net.

THE AMERICAN ELECTRIC FUSE COMPANY, offices at New York, Atlanta and Chicago, has designed and is now manufacturing an improved system of protection for telephones and switchboards. The company claims as its special advantages reasonable cost, first-class mechanical construction, scientific electrical design and the least possible expense for maintenance. Device is called the Rolfe protector, being perfected under the personal supervision of Charles A. Rolfe, recognized expert on protection.

THE D. VAN NOSTRAND COMPANY, 23 Murray and 27 Warren streets, New York city, has issued a new book entitled "How to Become a Competent Motorman," written by Virgil B. Livermore and James Williams, both of the Brooklyn Rapid Transit Company. It is a practical treatise on the proper method of operating a street railway motor car and how to overcome certain defects. The book contains over two hundred pages, is bound in cloth and sells for one dollar.

THE WESTERN ELECTRIC SUPPLY COMPANY, St. Louis, has just issued its general supply catalogue No. 50. It is devoted to general supplies, construction material, specialties, tools, etc., and is a piece of work worthy of the printer's art. While not containing the number of pages the previous catalogue held, the matter has been so condensed that about twice the amount of material has been listed. Any one in need of electrical supplies would do well to write for this catalogue, as it may be had for the asking.

THE VOUGHT-BERGER COMPANY, manufacturers of telephones and switchboards, LaCrosse, Wis., have during the past month secured contracts for the following complete exchanges: North Freedom Telephone Company, North Freedom, Wis.; Spring Grove Telephone Company, Spring Grove, Minn.; Norwood Young America Telephone Company, Norwood and Chaska, Minn.; Tomahawk Electric Water & Telephone Company, Tomahawk, Minn.; Blackduck Telephone Company, Blackduck, Minn.; Readstown Telephone Company, Readstown, Wis.; Moorefield Telephone Company, Moorefield, Ky.; Wilton & Ontario Telephone Company, Wilton, Wis.; LaCrosse Telephone Company, Onalaska, Wis.; Shiocton Telephone Company, Shiocton, Wis.; Hammond Telephone Exchange, Hammond, Minn.; Sanborn Telephone Company, Sanborn, Minn.; Decorah Farmers' Mutual Telephone Company, Decorah, Iowa; Ridgeway Telephone Company, Ridgeway, Minn., and also contracts for intercommunicating systems for the Browne-Hurley Hardware Company, Des Moines, Iowa, and Murphy Chair Company, Detroit, Mich.

THE AUTOMATIC ELECTRIC COMPANY, Chicago, has received an order for immediate delivery from the Imperial Telephone Exchange, which is managed by the postal department of the German government, for 1,070 automatic telephones and switches to be used in extending the automatic telephone service in Berlin, the German capital. The exchange which is to be enlarged has been in operation since May 20, 1900. It was built by the American company and operated until July, 1901, under the auspices of German telephone engineers, at which time it was purchased by the government.

THE AMERICAN ELECTRIC TELEPHONE COMPANY, Chicago, reports having completed the test on its special high frequency generator, which acts as a pole generator used in connection with the company's four-party selective system. Lively interest has been developed in this selective equipment, as many exchanges are beginning to see the advantage of party lines. The company also reports having made another shipment during the past week of telephone equipment to South Africa and the completion of a hotel system in the Avenue Hotel in Hot Springs, Ark. It is one of the largest hotel systems that has been installed for some time.

THE STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY, Chicago, has recently sold telephones, switchboards and supplies to the following companies: Wataga Mutual Telephone Company, Wataga, Ill.; Gays Mutual Telephone Company, Gays, Ill.; Cullom Mutual Telephone Company, Cullom, Ill.; Fairbury Telephone Company, Fairbury, Ill.; Millikan & Stokes Telephone Company, Edinburg, Ill.; Central Illinois Telephone & Telegraph Company, Lincoln, Ill.; Farmers' Mutual Telephone Company, Ashmore, Ill. Contracts have been closed for switchboards with the Bergholz Telephone Company, Bergholz, Ohio, and the Winona Telephone Company, Winona, Ohio.

WILL GRIDIRON NORTH HALF OF STATE.

The proposed purchase of the Iron Range Telephone Company of Duluth, Minn., means eventually a network of independent telephone lines running clear across Northern Minnesota. The Iron Range company now operates a system connecting Grand Rapids, Cass Lake, Bemidji and Crookston. The Zenith Telephone Company has thriving exchanges in Duluth and West Superior, and a toll line running out to Cloquet. By extending this from Cloquet to Grand Rapids, the Zenith Company would have a connected line from Duluth to Crookston, which would later be connected with Fargo and other points in the Red River Valley.

The Twin City Telephone Company has a line connecting with the Zenith system and the extension would mean an independent telephone connection from Minneapolis to the River Valley.

I have just examined my March TELEPHONY, which is indeed very gratifying. It contains more meaty matter than any telephone publication that has been issued for some time. Let the good work continue.—L. W. STANTON, Cleveland, Ohio.

Incorporations of The Month.

Harlan Telephone Company, Harlan, Ky. Capital stock, $1,000.

Iroquois County Telephone Company, Martinton, Ill. Capital, $10,000.

Union Telephone and Telegraph Company, Beloit, Kansas. Capital, $100,000.

Minburn Mutual Telephone Company, Minburn, Iowa. Capital stock, $20,000.

Electric Telephone Exchange Company, Volin, S. D. Capital stock, $10,000.

Connecticut Telephone and Electric Company, Meriden, Conn. Capital, $36,000.

Woolson Telephone Company, Des Moines, Ia. Increased capital from $5,000 to $10,000.

Appleton and Freedom Telephone Company, Appleton, Wis. Capitalization not given.

Vantown and Mason Mutual Telephone Company, Wheatfield, Ind. Capital stock, $2,000.

Bicknell Telephone Company, Bicknell, Ind. Capital, $6,000. Directors: J. H. Barr and others.

Waseca Telephone Company, St. Paul, Minn. Capital stock increased from $10,000 to $40,000.

Sweetzer Telephone Company, Sweetzer, Ind. Capital stock, $10,000. President, James E. Carry.

New Market Telephone Company, South Bend, Ind. Capital stock increased from $1,000 to $2,000.

Cape Cod Telephone Company, Barnstable, Mass. President, F. Percy Goss; treasurer, Arthur G. Guyer.

Home Mutual Telephone Company, Stony Point, Ind. Capital stock, $10,000. Joel Hall, chairman board of directors.

Green Center Telephone Company, Green Center, Iowa. Capital stock, $2,000. Incorporators: S. D. Miller and others.

Gays Mutual Telephone Company, Gays, Ill. Capital, $2,400. Incorporators: W. E. Storm, S. M. Blythe, A. W. Treat.

Jackson Telephone Company, Preston, Iowa. Capital stock, $25,000. Incorporators: N. J. Millhaem and F. V. Potter.

Woodlawn Park Telephone Company, Chicago. Capital, $2,500. Incorporators: J. C. Dean, F. A. Warren, J. P. Harrold.

Garrison Mutual Telephone Company, Garrison, Iowa. Capital stock, $10,000. Incorporators: James Grayson and others.

Carlisle Co-operative Telephone Company, Carlisle, Ind. Capital, $10,000. Directors: John Wipps, S. Boon, Charles Griffith.

Milledgeville Telephone Company, Milledgeville, Ga. Capital stock, $5,000. Directors: C. W. Richter, T. C. Parker, and others.

Bureau County Telephone Company, Manlius, Ill. Capital, $2,500. Incorporators: J. J. Stauffer, Ben Monson, A. L. Martin.

Anderson and Fall Creek Telephone Company, Anderson, Indiana. Capital stock, $40,000. Chief incorporator: Harvey Wertz.

Wolcott Telephone Company, Rockmart, Ga. Capital stock, $500. Incorporators: W. L. Craig, W. J. Adair, H. C. Allgood, and others.

Rocky Creek Telephone Company, Olin, Maryland. Incorporators: C. L. Myers, J. R. Huie, N. T. Summers, T. L. Jennings, and others.

Lynn Township Telephone Company, Lynn, Iowa. John Robinett, president; John Younger, vice-president; John W. Maus, secretary.

Star Line Telephone Company, Brown's Chapel, Ind. Capital stock, $40,000. Incorporators: J. W. Williams, A. H. Wiggins, J. Lipe.

Peerless Telephone Manufacturing Company, Rio, Wis. Capital stock, $10,000. Incorporators: David Robertson, J. O. Barrington.

Bovina and Middletown Telephone Company, Bovina, N. Y. Incorporators: Charles D. Sanford, William D. Winters, John W. Elliott.

Old Colony Automatic Telephone Company, Plymouth, Mass. Capital, $35,360. Anthony Atwood, president; Walter G. Loring, treasurer.

Willshire Telephone Company, Willshire, Ohio. Capital stock, $20,000. Incorporators: M. J. Kraeger, Julius Cantar and Louis J. Cantar.

Tarrey Telephone Company, Penn Yan, N. Y. Capital stock, $5,000. Incorporators: Isaac DuPuy, John P. Brown, Melvin H. Osgoodby.

Luana and Monona Farmers' Telephone Company, Luana, Iowa. Capital stock, $2,500. George Daubenberger, president; J. L. Eno, secretary.

W. H. Patterson Telephone Company, McCrary, Maryland. Capital stock, $20,000. Incorporators: W. H. Patterson (president), and others.

West Wisconsin Telephone Company, Glenwood, Wis. Capital stock, $5,000. Incorporators: Thomas Brockly, D. H. Syme and C. J. Augustin.

Norwood Telephone Company, Norwood, N. Y. Capital stock, $25,000. Directors: W. J. Fletcher, F. L. Smith and A. C. Healey, all of Norwood.

Celina and Mercer County Telephone Company, Celina, Ohio. Capital stock, $80,000. Incorporators: G. E. Nungester, C. G. O. Miller and others.

Augusta Mutual Telephone Company, Augusta, Ill. Capital stock, $2,000. Incorporators: George Catlin, William S. Beard, Benjamin B. Crain.

Mutual Telephone Company, Braman, Oklahoma. Capital stock, $30,000. Incorporators: Q. T. Brown, A. R. Hanna, P. D. Vancleave, D. M. Lemar.

Badger Telephone and Telegraph Company, Milwaukee, Wis. Capital stock, $150,000. Incorporators: C. C. Russel, H. J. Droppus, E. L. Richardson.

East Watson and Gilmore Rural Telephone Company, Watson, Ill. Capital stock, $1,600. Incorporators: E. W. Tucker, C. F. Burkhardt, V. C. White.

Home Mutual Telephone Company, Elkhart, Ind. Capital, $10,000. Directors: Joel Hull, W. B. Anglin, Alonzo Burket, J. K. Anglin, Z. T. Byres.

Western Union Independent Telephone Company, Lincoln, Neb. Capital stock, $1,000,000. Incorporators: C. J. Billings, A. W. Field and F. H. Woods.

Phalanx-Leavitteburgh Telephone Company, Phalanx Station, Ohio. Capital, $5,000. Incorporators: C. J. and A. N. Rood, W. O. Chaffie, and others.

Hoagland Run Telephone Company, Blissfield, Ohio. Capital stock, $5,000. Incorporators: Andrew Reiss, F. M. Curtis, H. W. Soudele, G. Schilborn.

Interstate Telephone Company, Mt. Horeb, Dane county, Wis. Capital stock, $12,000. Incorporators: Martha E. Buell, Frank E. Buell, Lewis F. Heuer.

Southern Telephone Construction Company, New York City. Capital stock, $50,000. Incorporators: Frank Hart, Charles H. Lemmon and C. Bond Lloyd.

Farmers' Telephone Company, Seattle, Wash. Capital stock, $10,000. Officers: J. A. Willis, president; W. S. Egbers, vice-president; D. A. Scott, secretary.

Elida Mutual Telephone Company, Elida, Ohio. Capital, $21,000. Directors: L. D. Crites, R. E. Jones, C. D. Brenerman, W. S. Peters, L. M. Roush, David Culp.

Algoma Farmers' Mutual Telephone Company, Algoma, Wis. Capital stock, $500. Incorporators: B. B. Churchill, Conrad R. Guth, Emil Miller, Emil Maedke.

Banner Telephone Company, Greenland, Ind. Capital stock, $10,000. Officers: George Hammer, president; Pearl Parrish, secretary; Howard Brooks, treasurer.

Short Line Telephone Company, Nevada, Iowa. Capital, $5,000. Incorporators: F. M. Boardman, A. N. Drake, R. B. Ballard. Officers: F. M. Boardman, president and manager; F. L. Rowe, vice-president; R. B. Ballard, secretary; W. H. Nelson, treasurer.

West Shore Home Telephone Company, Catskill, N. Y. Capital, $100,000. Directors: S. R. Ramson, T. M. Brush, Elyria, Ohio; Howard Hendrickson, Albany.

Callender Mutual Telephone Company, Callender, Iowa. J. C. Peters, president; N. Holverson, vice-president; A. M. Peterson, secretary; George Evenson, treasurer.

New York and Northern Telephone Company, Troy. Capital stock, $50,000. Directors: Fletcher S. Hyatt, New York; J. V. Jacobs and C. B. Gardner, Troy, N. Y.

Cedar Lake Telephone Company, Schleisingerville, Wis. Capital stock, $2,000. Incorporators: John Rosenheimer, Sr., John Rosenheimer, Jr., and Mrs. Mary Rosenheimer.

Kidron Telephone Company, Kidron, Ohio. Capital stock, $15,000. Incorporators: Valentine M. Gerber, Jacob P. Kammer, Charles C. Gerber, J. F. Armstutz, and John J. Bixler.

Central Illinois Telephone and Telegraph Company, 15 Exchange Place, Jersey City, N. J. Capital stock, $500,000. Incorporators: Louis Bailey, K. K. McLarin, H. O. Coughlin.

Central New Jersey Telephone Company, 18 South Stockton street, Trenton, N. J. Capital stock, $100,000. Incorporators: Frederick J. Randolph, Bruce Bedford, Charles W. Wright, all of Trenton.

Leroy Telephone Company, Leroy, Mower county, Minn. Capital stock, $100,000. Officers: C. Mearcklin, president; Fred Henslin, vice-president; Charles J. Mearcklin, secretary; A. E. Henslin, treasurer.

Columbia Mutual Telephone Company, Columbia, Marion county, Iowa. Capital stock, $2,000. Incorporators: W. A. Wilson, James A. McCarkle, J. R. Schutts, E. D. Flanagan, Wm. Bingham and J. E. McCarkle.

Farmers' Mutual Telephone Company, Attica, Ohio. Capital stock, $3,000. Incorporators: J. W. Walker, D. E. Schaaf, A. W. Knight, William Schaaf, Charles H. Armitage, J. A. Carpenter, A. S. Sourioing.

Eastern Telephone Company, York, Pa. Capital stock, $8,000. Directors: A. M. Grove, Muddy Creek Forks; M. H. McCall, Gatchelville; H. S. Merryman, B. F. Mercer, Fawn Grove; J. A. Gailey, New Park; C. V. Shaw, Stewartstown.

Colorado Automatic Telephone Company, Denver. Capital stock, $500,000. Directors: I. W. Bonbright, D. V. Donaldson, J. G. Shields, F. F. Castello, A. T. Gunnell, E. W. Giddings, Jr., J. A. Himebaugh, C. L. Hemming, A. G. Sharp, F. G. Peck, J. Arthur Connell.

New Home Telephone Company, Bloomfield, Ind. Capital stock, $50,000. Directors: John Davidson, Lyons; U. G. Dixon, Linton; Joe Moss, C. C. Ballard, Bloomfield; James F. Hodges, Z. P. East, Worthington; Peter Schloat, Linton; Peter M. Stone, Scotland, all of Indiana.

The Farmers' Mutual Telephone Company, Emmons, Minn. Capital stock, $10,000. Officers: H. M. Bergeson, president; P. A. Peterson, vice-president; George C. Emery, secretary; K. M. Trow, treasurer; and L. A. Larson, O. A. Thompson and S. L. Davidson, directors.

GOVERNMENT TELEPHONE SERVICE IN AUSTRALIA.

Hugh H. Lusk, in the Review of Reviews for March, gives some data on the telephones of the federated Australian colonies, which follows:

"By far the most extensive, and almost, if not quite, the most important department of the government service transferred by the constitution to the administration of the federal government was that of the postoffice. In the case of Australia, as in that of its neighbor, New Zealand, the postal service includes also the telegraph and telephone services of the country, which have from the first been incorporated with the postoffice. From the first establishment of a telegraph system in all the colonies of Australasia, the telegraphs had been regarded only in the light of the most modern development of the postal system, and as such had been treated as a branch of the department. In this form they were handed over to the federal government, and it became necessary to pass an act to reorganize and unify the various systems that had grown up in the original colonies. The statute by which this is done is interesting in many ways, and not least in the evidence it supplies of the characteristic free-handedness shown by the people of Australia in supplying the needs of the community and of the economy with which it may be done.

"The telephone is a convenience of much more recent introduction in Australia than the telegraph, and for a time it appeared doubtful whether it would be taken in hand by the government, or left, as elsewhere, to private enterprise. Finally, however, it was taken in hand by one colonial government after another, and there is now probably not a town possessing a population of 3,000 persons or upward which is not supplied with a telephone exchange. There are at present, it would appear, fully a hundred more or less important centers of population in the commonwealth supplied with this convenience, and hitherto the cost has differed materially in the different states. This is one of the anomalies which can be done away with as a consequence of the federation, and hereafter the charges will be on a uniform scale, which, compared at least with some of the experiences of older and far more densely peopled countries, would seem to be moderate. There will be three different kinds of telephone service provided, for which different rates will be charged. The business telephone service will give the unlimited use of the telephone at all hours within the limits of the municipality, at an annual charge of $40; for a similar service, including both the town or city, and suburban area, the annual charge will be $50; and for private residences—without any restrictions as to the number of messages or limitations as to hours, the rate, which would seem to include both town and suburban service—is fixed at a uniform charge of $25. There does not as yet appear to be any provision made for long distances, which probably arises from the fact that the centers of population are widely scattered, nor does any provision seem to be made for public pay stations in the larger cities. As every postoffice and branch office in the towns is already a telegraph station, however, there can be little doubt that such an extension of the system for the public convenience will be made on reasonable terms as soon as the demand arises."

RICHLY DESERVED PROMOTION.

James F. Nathan, assistant of J. C. Smith, manager of the Chicago office of the Western Union Telegraph Company, who received the appointment of manager of the Western Union Telegraph Company, Boston, March 1st, is one of the handsomest and one of the most popular young men connected with the company. Mr. Nathan is a native of Baltimore. He entered the service of the telegraph company about fifteen years ago in the capacity of messenger. After succeeding in mastering the details of the telephone and telegraph busi- in his native city, he moved to Chicago and secured employment under A. C. Murphy of the Western Union Telegraph Company. The conspicuous ability and fine Chesterfieldian diplomacy which he displayed in adjusting the many difficult and important matters submitted to him won the admiration and praise of his superiors, and he was promoted after a few years' service to the position of chief clerk and general solicitor under E. M. Mulford, Jr. He was retained by J. C. Smith when the latter succeeded Mulford in the management of the Chicago office. A few evenings prior to Mr. Nathan's departure for Boston he was tendered a farewell dinner by a number of his friends, who presented him a handsome gold watch as a testimonial of their regard and esteem.

Progress of Independent Telephony in Canada

One of the latest moves of the Canadian Bell Telephone Company, in order to retain its vast prestige, is the attempt to put out of business the automatic service of the Markham and Pickering Farmers' Telephone Company, operating in Markham and Pickering townships, about twenty miles east of Toronto.

This service was organized after futile efforts to interest the Bell company to build a line covering the points named. It answered that the business of the territory did not warrant the construction of the line. The Markham-Pickering company is composed of the best and most influential farmers of the section, who are all good customers of the Canadian Pacific railway, which runs through Locust Point, the center of the Markham-Pickering system. It was to further business facilities that it was deemed advisable by the members of this telephone company to install a telephone in the office of the Canadian Pacific railway at Locust Point. Accordingly, steps were taken to install the instrument, which was met with direct opposition from those in control at the station, and an appeal was then made to the president of the railroad company. So characteristic is the answer to this appeal that it is printed herewith:

"Montreal, Feb. 5, 1903.

"A Hoover, Locust Hill:

"Very sorry that we cannot comply with your request unless it be with the consent of the Bell Telephone Company, with whom we have a contract for privileges in our stations. T. G. Shaughnessy."

What seems to be the surface reason for such action as the foregoing is that in return for free telephones the railroad company is literally bound in agreement for free transportation of men and supplies of the Bell company, to the entire exclusion of all other telephonic access.

As a result of this monopolistic movement on the part of the Bell Telephone Company, a committee composed of subscribers of the new company, waited upon W. F. Maclean, M. P., who will at the next session of parliament introduce a bill that will, should it pass, forbid any railway from giving any preference to any one telephone company. Robert Beith, M. P., of West Durham, has agree to support the McLean effort.

The aggressive movements of the Markham-Pickering company were a surprise to the Bell people, and on February 12 representatives of the latter company visited members of the former and tried in various ways to settle what promised to be a conflict for supremacy. President Hoover, as authority for the Independent company, emphatically refused to accept any conditions, and said that his corporation was standing for its own individual rights, and that the people of that section wanted merely what the law prescribed, namely, justice. In reply to an offer to arbitrate the matter, the Bell company flatly refused to consider it.

Accordingly, on February 26-27, a representative for President Sise of the Bell company appeared before magistrates at Whitevale as defendant in the aforesaid case. During the trial, the most startling and convincing evidence introduced was the contract which the Canadian Bell Telephone Company and the Canadian Pacific railroad were parties to, a copy of which follows:

CONTRACT.

This agreement executed in duplicate at the City of Montreal, in the Province of Quebec, the first day of May, 1902: By and between the Bell Telephone Company of Canada, Limited, a body corporate having its principal offices in the said city, hereinafter called the Telephone Company, and

The C. P. R. Company, a body corporate having its principal office in the said city, hereinafter called the Railway Company. Witnesseth:

That the said parties have covenanted and agreed as follows:

1. The Telephone Company will furnish to the Railway Company, at all points in the Dominion, and where it may now or hereafter have exchanges, telephone connections between the offices and stations of the Railway Company and the exchanges of the Telephone Company free of charge. It will also issue to the officers of the Railway Company annual passes or franks good over the long distance lines of the Telephone Company and free telephone exchange connection and maintain during the term of this contract a local exchange in the head office of the railway at Windsor street station, Montreal, affording communication with the different offices, as well as with the said local exchanges of the Telephone Company in the City of Montreal.

2. The Railway Company will furnish annual passes to the officials of the Telephone Company over its own railway and telephone lines, and lines leased or controlled by said Railway Company, and will also furnish free transportation to the employes of the Telephone Company over said railway lines in Canada.

3. The Telephone Company shall have the exclusive right of placing telephone instruments, apparatus and wires in the several stations, offices and premises of the Railway Company throughout the Dominion of Canada, when the Telephone Company has or may during the life of this contract established telephone exchanges, it being understood in connection with new exchanges being established that the Railway Company will be given a fair service sufficient for its business.

4. And each company, so far as it may properly do so, without prejudice to its own business, grants to the other company facilities for carrying its wires and lines through or over the poles, subways, bridges and other premises, on equitable terms, to be agreed upon. And the Railway Company will not grant similar facilities to any other Telephone Company.

5. The number of annual passes or franks, free telephone connections and extent of free transportation shall be determined from time to time by the president of the Railway Company and the president of the Telephone Company, as the expansion of both companies may require, and such passes, franks and telephone connections shall only be issued on written application of an officer of either party, as designated by the president of each company.

6. The terms and conditions of this contract, as applying to the C. P. R., shall also apply to the C. P. R. Telegraph Company, and it is further understood and agreed that where telephone connection with local exchanges is required for an office of either of the above, the agent for which carries on any other business, or acts as agent for any other company, he shall pay one-half the regular exchange rates, and the company or companies represented herein by the C. P. Railway Company shall pay nothing for their services.

7. This agreement shall remain in force for a period of eight years from the date hereof.

In witness whereof each of the said parties has caused to

be set hereto its corporate seal and the signatures of the officials below named.

(Seal) C. P. R. Co., by—D. McNICHOLL,
Second Vice-President.
A. R. G. HEWARD,
Assistant Secretary.
Bell Telephone Co., by—C. F. SISE,
President.
CHAS. P. SCLATER,
Secretary-Treasurer.

At the conclusion of the evidence introduced, a reservation of verdict was ordered until March 5, and upon the latter named date a surprise was sprung, in that the magistrates had disagreed upon a verdict.

At this point, when the evidence seemed so clear and conclusive, to have the magistrates disagree, produced no little dissatisfaction among the farmers, and on March 6 a meeting was held and arrangements were made to force another trial, whereupon Crown Attorney Dewart, on March 13, filed with Judge Morgan request for permission to carry the case before the York county grand jury, accompanying same with an exhaustive review of the subject in hand, and an expression of opinion that conspiracy law had been violated, with the result that upon March 16, Judge Morgan sent the case to the grand jury, and indictments were returned as follows:

The jurors of our Lord the King present that the Bell Telephone Company of Canada, Limited, within the limits of the County of York, in the month of February, in the year of our Lord one thousand nine hundred and three, unlawfully did conspire, agree and arrange with a certain railway company, to wit, with the Canadian Pacific Railway Company, to unduly limit the facilities for transporting articles and commodities, which are the subjects of trade or commerce, to wit, ordinary farm and other produce, by refusing telephone communication and privileges to one Harrison Johnston and others, thereby committing an indictable offence, contrary to the Criminal Code, Sec. 520.

And the jurors aforesaid do further present that afterwards, to wit, in the month and year aforesaid, within the limits of the County of York aforesaid, the said Bell Telephone Company of Canada, Limited, unlawfully did agree and arrange with a certain railway company, to wit, with the Canadian Pacific Railway Company, to unduly limit facilities for supplying and dealing in certain articles or commodities, which are the subjects of trade or commerce, to wit, in telephone instruments, apparatus and wires, and did thereby commit an indictable offence, contrary to the Criminal Code, Sec. 520.

And the jurors aforesaid do therefor present that afterwards, to wit, in the month and year aforesaid, within the limits of the County of York aforesaid, the said Bell Telephone Company of Canada, Limited, unlawfully did agree and arrange with a certain railway company, to wit, with the Canadian Pacific Railway Company, to unduly prevent or lessen competition in the sale, transportation and supply of certain articles or commodities, which are subjects of trade or commerce, to wit, in telephones, telephone apparatus and wires, and did thereby than commit an indictable offence, contrary to the Criminal Code, Sec. 520.

Although the action of the Bell company in thus making itself a party to a contract of the nature above set forth is not surprising, it would still seem that the men who are at the head of so large a corporation would at once see the advisability of avoiding a proposition of this kind, knowing that sooner or later a vigorous protest would be entered against any such proceedings. This is probably one of the hardest blows that the Bell company has ever suffered, and it will be the means of the Independent movement obtaining a firmer foothold than ever upon Canadian soil.

It is expected that President Sise of the Bell company will be put upon trial to answer the various indictments on or about May 1. Much interest is centered about the coming trial inasmuch as the decision will more or less affect the operations of the various telephone systems throughout the country.

A Magnetic Phonograph—The Telegraphone.

The telegraphone, as its name indicates, is an instrument for recording speech at a distance. It not only records it, but automatically reproduces the same speech whenever desired, thus presenting that goal of so many inventors, the telephonic repeater. In many respects it resembles the ordinary phonograph; at first appearance, in fact, being very often mistaken for a modified form of that device.

While the phonograph and all other forms of talking machines will reproduce speech, their action is purely a mechanical one, there being no means provided whereby they may be worked in connection with a telephone and thereby afforded a wider field of usefulness.

The telegraphone, which is the invention of Waldemar Poulsen, a Danish engineer, however, receives speech in the form of an oscillatory electric current just as a telephone does, and is connected to the transmitter by a wire of any desired length. The sole difference between a telegraphone and a telephone circuit is that the latter terminates in a receiver instead of a recording telephone.

The first model of the telegraphone shown in operation was that at the last Paris Exposition, where it attracted an extraordinary amount of attention and was generally spoken of as the most interesting piece of apparatus there exhibited. This model is described as follows:

A spiral of steel wire is wound on a cylindrical drum, which is revolved by either an electric or spring motor or by hand. Situated above the drum is a small double-pole magnet, the two cores of which consist of iron wires placed at an angle. The ends of these poles embrace the wire on the cylinder, thereby completing the magnetic circuit.

The magnet, attached to a brass support, is mounted on a shaft, so that it is caused to move from right to left when the drum is revolved, being guided by a grooved finger resting on the steel spiral, each turn of the spiral, therefore, passing before the poles to the magnet.

The recording magnet is connected in circuit with a carbon transmitter and a couple of cells of battery. When the transmitter is spoken into, currents of various strength, proportional to the strength of the sound waves which strike the diaphragm, pass through the wires of the magnet, which transversely magnetizes the steel wire on the drum, permanently recording thereon "lines of force," which represent, as may be readily seen, the sound waves reaching the diaphragm of the transmitter.

When the spiral has been filled, the magnet is caused to return to its original starting point in the following manner:

The horizontal shaft parallel to the guide rod for the

carriage is mounted also above the drum, upon which is a thread of steeper pitch with which another point on the traveling carriage is caused to engage automatically with the disengagement of the point on the recording wire when the end of the cylinder is reached, the carriage being returned to the beginning of the record at a high rate of speed.

The drum is now revolved again, and as the magnetized spiral passes before the poles of the magnet, it is transformed into a miniature form of dynamo, exuding currents of electricity of a strength and direction corresponding to the magnetization of the steel wire.

Before the drum had been revolved a second time, a tele-

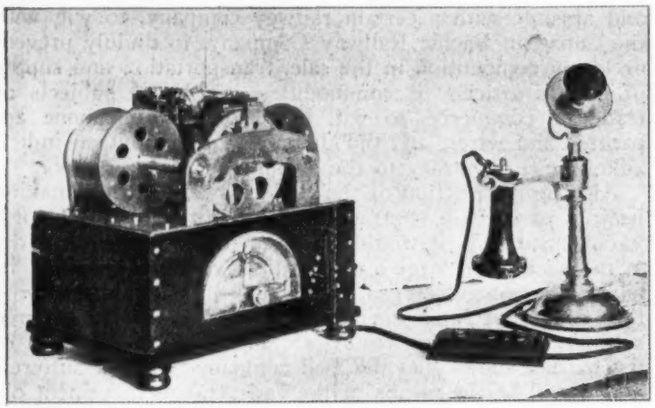


FIG. 1—THIRTY MINUTE TELEGRAPHONE CONNECTED TO TELEPHONE.

phone receiver had been switched into the circuit, replacing the transmitter previously employed. The currents sent out by the steel spiral while passing before the magnet, correspondingly affect the receiver, reproducing the words and sounds spoken into the transmitter.

This is done with absolute fidelity and with an entire absence of the false sounds noticed in the phonograph.

In order to obliterate the speech or lines of force on the steel wire and thus prepare the way for a new record, the recording magnet is placed at the end of the drum and connected with a couple of cells of battery. The constant magnetizing current supplied to the magnet entirely effaces the record on the steel wire while it is being passed before the poles of the magnet in a manner similar to that employed when the record was made.

In order to facilitate the taking of longer records, and also to allow of their transportation, should the instrument be used as a correspondence phonograph, a slightly different type of instrument is employed.

A coil of thin flat spring is wound from one reel to another across the poles of two small horseshoe magnets having flat poles, the poles touching the lower side of the steel ribbon only. The first magnet is traversed by a continuous current for obliterating the previous record, and the second magnetizes the strip corresponding to the message spoken into the transmitter, with which it is connected.

Since the above described machine was placed on exhibition, a different type has been brought to this country from Denmark and is now being shown by the American Telegraphone Company at 20 West Thirty-third street, New York City. Various styles of this machine are shown in the accompanying illustrations. The type of telegraphone which was above described is what is known as the drum machine, the later type being known as a spool machine.

The machine shown in Fig. 1—known as a 30-minute machine—consists essentially of a recording magnet system and a mechanism for winding the wire from one spool on to another as the record is made by the passage of the wire between the magnet poles. The spools are mounted upon a brass bed plate covering a box in which are located two motors, whose object is to drive the two spools and the reciprocating mechanism by which the spools are oscillated to preserve regularity of winding. In connection with the driving mechanism there is also an indicating mechanism, showing on a dial at the front of the box the amount of wire on which the record has been made and hence the amount of unused wire remaining. There are also fixed stops provided by which the motor can automatically be stopped at a predetermined point in either direction. A switchboard outside of the box is provided for starting, stopping and reversing the motors as required. The wire from the unused spool passes in this instrument between opposing horizontally disposed poles of three sets of magnets, two of which are active at a time. The object of the third set is simply that a record may be made in either direction if desired. The center pair of these three pairs of magnets is the recording magnet, which also acts as a polarizing magnet. The other pair are demagnetizing or obliterating magnets. The polarizing and recording processes occur simultaneously, that is to say, the wire passes first between the poles of a strongly energized magnet and is given a strong polarization of like sign throughout. It then passes through the middle pair of magnets which contains two windings, one a polarization winding energized in series with the obliterating magnets from a local battery, and the other the recording winding, which passes to the secondary of the transmitter induction coil when recording, or to the telephone receiver when reproducing.

The recording magnets are horizontally placed in the same straight line, their poles opposing and embracing opposite sides of the wire. The magnetic circuit is not complete, it having been found that better results are obtained with an open than with a closed magnetic circuit. Two sets of demagnetizing magnets are located on either side of the central recording magnet. One of these magnets only is used

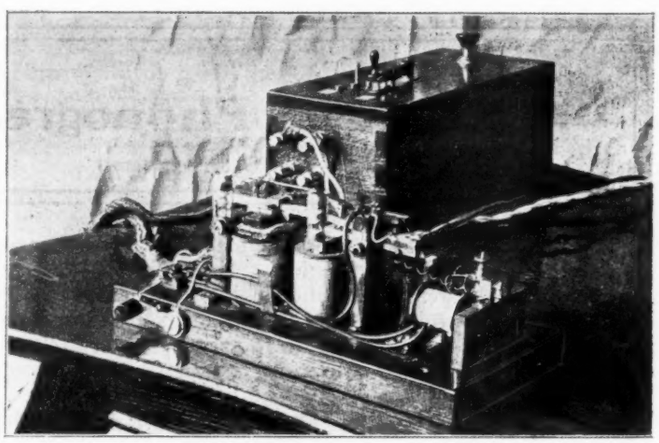


FIG. 2—RELAY USED TO START THE OPERATION OF THE TELEGRAPHONE.

at a time and there are two sets in order that dictation may be given with the wire running in either direction.

With this machine is provided an automatic starting relay—Fig. 2—for use in connection with machines used as telephone recorders. This consists of a set of magnets in series with the telephone line which are actuated by the magneto current to close the circuit and start the telegraphone. A winding in series with the telegraphone motor holds the circuit closed until a magneto current opens it, the ring off of the subscriber doing the talking being relied upon for this purpose.

The machine used for the distributing of news—Fig. 3—consists of an endless band running at a high speed. It passes first over a pair of obliterating permanent magnets,

then over a polarizing magnet, the recording magnet and transmitting magnets in succession in the order named. Any number of transmitting magnets may be employed. A telephone receiver is connected with the recording magnet and the record may be successfully reproduced upon the transmitting magnet, the circuit from each transmitting magnet being connected to a separate telephone line over which the recorded message is transmitted. As fast as it passes from

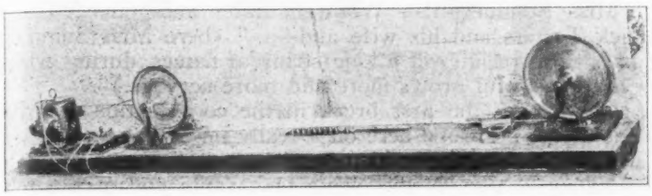


FIG. 3—THE NEWSPAPER DISTRIBUTING OR REPEATING TELEGRAPHONE.

the last transmitting magnet the message is obliterated, the band polarized, and it is again impressed with the record.

Besides being used for the distribution of news this type of machine can be used in place of the stock ticker when used in connection with the recording instrument, as well as for train dispatching, a record of each transaction and message or order being obtained for future reference.

Recent advices received from Denmark state that a method has been discovered by means of which iron can be deposited electrolytically upon any other metal, the iron thus deposited possessing six times the permeability of the present speech carrier employed in the telegraphone, which heretofore has been some commercial material, such as steel tape or piano wire.

By permeability is meant the conductivity for magnetic lines of force; in other words, it is a measure of the ease with which magnetism passes through any substance.

Up to the present the material used in the speech carrier was rendered receptive to peculiar effects corresponding to the variable hardness throughout its entire length, the result being a continuous hum heard in the telephone receiver,

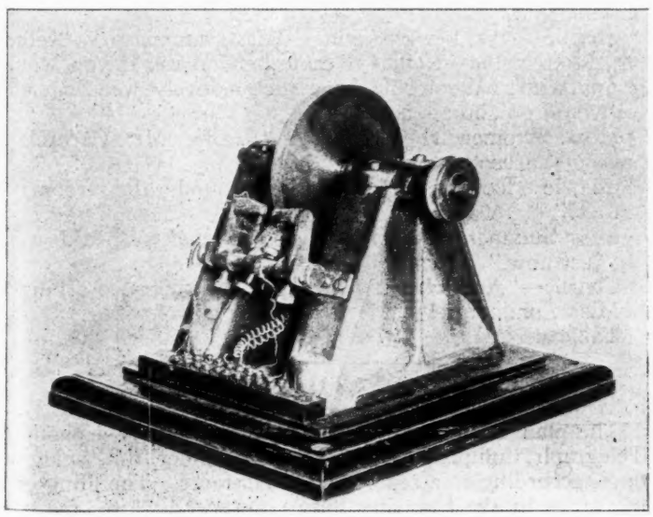


FIG. 4—MODIFIED FORM OF NEWSPAPER DISTRIBUTING TELEGRAPHONE.

which detracted greatly from the intelligibility of the message being reproduced by the telegraphone.

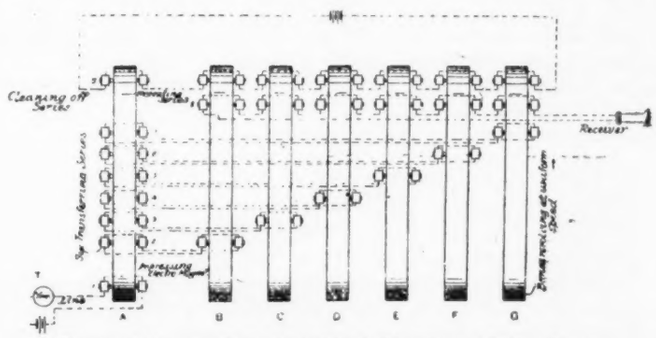
The method of depositing iron by means of electrolysis overcomes this difficulty, as it renders the material used as a speech carrier entirely homogeneous, the hardness of the metal being uniform throughout.

A plate about the size of a postal card made according to this new method is large enough to receive upon its surface a message of three and a half minutes' duration. After the record has been made the plate may be enclosed within an envelope and mailed any distance. It can be demagnetized, that is, the message can be obliterated and once more used for the same purpose. The more or less rough handling which it would be apt to encounter in its journey would have no effect upon the record.

Experiments which have been made for the purpose of applying the telegraphone as a telephonic repeater or relay while satisfactory, did not quite reach the expectations of the experimenters, the drawback being due to the humming heard in the receiver. This fault has now been overcome through the use of the electrolytic iron method.

The following method is employed in applying the principle of the telegraphone to a telephonic repeater:

A series of disks are mounted on a common shaft. Closely approaching the first disk are the poles of an electro magnet which is connected to a telephone transmitter. A little further along is a second magnet which is connected to a similar magnet on the adjoining disk. Following the second magnet on the first disk is a third magnet connected with a similar magnet on the third disk. In a like manner magnets further on on the first disk are



Illustrating the Connections Employed in Applying the Telegraphone as a Telephone Repeater.

connected with corresponding magnets on the rest of the disks. Beginning with the second disk the balance of the disks have another magnet, these magnets being connected in series with a telephone receiver. A third magnet on each disk, used for demagnetizing, is connected in series with the others.

The disks having begun to rotate, which is brought about by means of a spring or electric motor, or by hand, the transmitter is now spoken into. The currents set up in the transmitter are conveyed to the first magnet on the first disk, transferring upon it lines of force. As the disk revolves and passes under the second magnet it generates currents which are transmitted to the corresponding magnet on the next disk, there to repeat the same magnetic effect. The same action takes place between the third magnet and the third disk, and so on until all of the disks are each impressed with the same lines of force. After having made half a revolution the second, third, fourth and other disks pass under and energize the series of magnets.

This series of magnets combines the lines of force stored up on each disk and sends them over the line into the receiver.

Finally, the last series of magnets obliterates the record and leaves the disks free to receive a new record. By using this method of relaying speech could be intelligibly transmitted from New York to San Francisco.

Several tests recently made over the long-distance wires of the American Telephone and Telegraph Company gave very satisfactory results. One circuit—which was the equivalent of a 207-mile metallic circuit (single distance)—was first tested with a telephone and proved to be a fair commercial circuit. A record was then made by means of the telegraphone, every word of which was intelligible, the

volume of sound being very strong. Another test was made over a circuit of 280 miles, the record in this case being even more satisfactory. The record was exceedingly good and intelligible, in spite of the fact that a part of the record contained unusual words, making a somewhat severe test. The volume in this test was better, as was also the intelligibility.

In a test made in order to show the permanence of records made by means of the telegraphone a record was repeated 2,000 times without showing any appreciable deterioration.

The field of the telegraphone is practically unlimited. It can be used for entertainment and instruction in business offices for dictation; in telegraph and telephone stations; stockbrokers' offices; in fact, anywhere where an apparatus is required for recording and reproducing speech or messages.

It has received the unqualified endorsement of such noted scientists as Lord Kelvin, Nikola Tesla and Marconi and the engineering fraternities on both sides of the Atlantic.—The Electrical Age.

THE LADY AND THE TELEPHONE.

ACT I—In the rooms of the All Around Club. Charlie Careful and Reginald Quick discovered seated with their feet elevated on the window sill, gazing out into the street. Both men are smoking.

Charlie (suddenly)—"I have an idea!"

Reginald (surprised)—"For heaven's sake!"

Charlie (confidentially)—"Yes, you wouldn't believe."

Reginald (positively)—"No."

Charlie—"Well, I have. I think I will get married."

Reginald (dubiously)—"How long since?"

Charlie—"Some time. I have been deliberating over the matter for two months. I am growing tired of this bachelor existence. It's stupid—with apologies to you—killing time here in the club. I am sure with my income and my quiet ways I could make some girl happy. You see——"

Reginald (interrupting)—"Certainly, old man; there is no doubt about it. But 'some girl' is too indefinite. You mean 'one girl.' Men in your state of mind always mean a particular angel. Name her."

Charlie (hesitatingly)—"You know her."

Reginald—"I do?"

Charlie—"Yes."

Reginald (after a pause)—"Well?"

Charlie—"And I rather think you like her."

Reginald (a light dawning upon him)—"You mean Nellie——"

Charlie (interrupting)—"Yes; Nellie Summergirl."

Reginald (startled)—"Have you proposed to her?"

Charlie—"No; but do you think she would throw me over?"

Reginald—"Why don't you ask her?"

Charlie—"By Jove, old boy, that is the very thing I am going to do!"

Reginald—"When?"

Charlie (enthusiastically)—"Now; this very afternoon. No time like the present, you know. I will go and see her right away Reggie, old man, give me your blessing. Bybye!" (Exit.)

Reginald (soliloquizing)—"Well, Reggie, you must hustle if you don't want to lose the best thing in the world." (Departs smiling.)

ACT II—At the telephone.

Reginald—"Hello, central! Give me 444. (After a pause.) Is that 444?....Thank you. Is Miss Summergirl at home? .... No?.... Out driving?.... And when do you expect her?.... Very soon?.... Yes, I will call her up again in a little while. ....No, needn't mind about the name, I will call again later."

ACT III—In the drawing-room of the Summergirl residence. Miss Summergirl, suddenly appearing in driving costume, discovers Charlie Careful awaiting her return. She greets him cordially.

Miss Summergirl—"How are you, Mr. Careful? Isn't it a lovely afternoon?"

Charlie—"Delightful, I assure you. And have you had a pleasant drive?"

Miss Summergirl—"We went miles and miles. I saw Jack Towers and his wife and——" (here Miss Summergirl begins reeling off a long string of names, during which Charlie Careful grows more and more nervous.)

Charlie (at the first break in the conversation)—"Miss Summergirl, I came here on a really important matter."

Enter Nancy, the maid.

Nancy—"Miss Nellie, some one wants you at the telephone."

Miss Summergirl—"Wants me?"

Nancy—"Yes'm." (Exit.)

Miss Summergirl—"Will you excuse me, Mr. Careful? I will return in a moment."

Charlie (alone)—"I really believe that now I have the courage to ask her."

ACT IV—At the telephone in the Summergirl residence.

Miss Summergirl (with the transmitter before her and the receiver at her ear)—"Well?....Yes, I am here. Who is it talking? ....Mr. Quick? Oh, how do you do?....I am glad to hear it. You say you have something important to say to me. That's funny. Mr. Careful said the same thing a minute ago. What?....Yes, he is here....What? Has he proposed to me? Oh, Mr. Quick, what are you talking about?....That was what he came for?....No, if he hasn't asked me, how could I have accepted him?.... WHAT?.... Will I marry you?.... This is so sudden! ....Whoever heard of such a thing?.... Want my answer now?.... Well, YES! And, Reginald—doesn't that sound funny?—say, Reginald, come up here right away. He'll go pretty soon."

ACT V—In the drawing-room of the Summergirl residence. Miss Summergirl reappears with radiant face and excited manner. Mr. Careful's courage is at the sticking point.

Charlie—"As I was saying, Miss Summergirl—Nellie! Oh, Miss Nellie—Nellie—I came here to ask if you would be my wife! We would have such a lovely wedding, and we would go abroad, and——"

Miss Summergirl (smiling)—"Really, Mr. Careful, I have just accepted another man!"

Charlie (looking with surprise around the room)—"How?"

Miss Summergirl—'Over the telephone. When I went out just now."

Charlie—"And who, if I may take the liberty of asking?"

Miss Summergirl—"Mr. Reginald Quick!"

Tableau.

EXTENSION WILL BE LARGE.

The plan of development of the Maryland Telephone & Telegraph Company is to be placed under full swing at once, according to a report from Baltimore. The filing of a mortgage by the company for $4,000,000 discloses the possession of a large amount of money to be used in enlarging its plant. Mr. George R. Webb, when asked about this mortgage, said: "There is set aside $1,000,000 of these bonds to redeem a like amount now outstanding and $1,100,000 worth has been sold to supply cash to pay off the floating debt of the company, and furnish all the money necessary for the extension to be made. There will still be $1,900,000 of bonds in the treasury for future uses." When asked as to these extensions Mr. Webb said: "We have now in use about 7,500 telephones. This number will be immediately increased to 10,000."